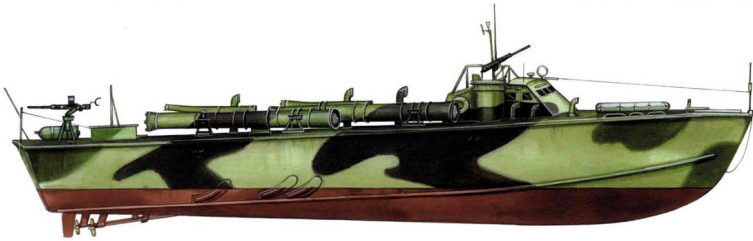
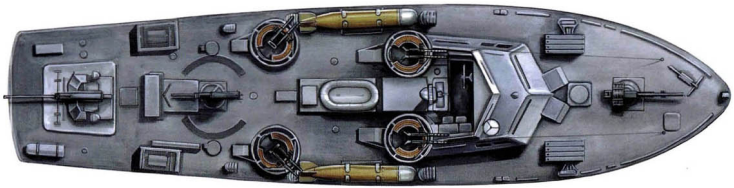
US PATROL TORPEDO BOATS

World War II





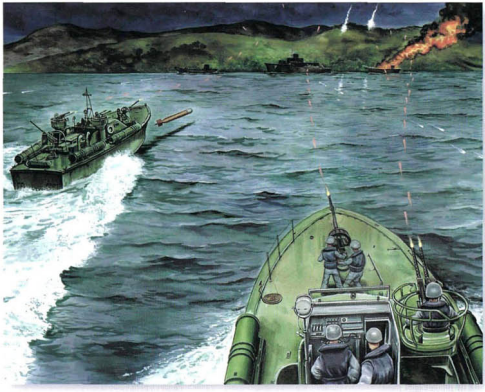
GORDON L ROTTMAN

ILLUSTRATED BY PETER BULL

NEW VANGUARD • 148

US PATROL TORPEDO BOATS

World War II



GORDON L ROTTMAN ILLUSTRATED BY PETER BULL

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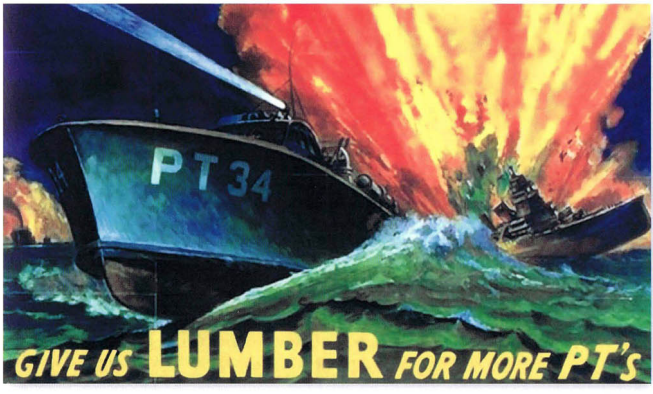
US PATROL TORPEDO BOATS: WORLD WAR II

INTRODUCTION

One of the best known, most popular in lore, and admittedly "romantic" warships in the US Navy was the PT boat, the patrol torpedo boat. Even persons relatively unfamiliar with the World War II Navy know what a PT boat was. There is a certain degree of adventure associated with the notion of small, high-speed boats marauding into the night to hunt for enemy ships and small craft. It creates a David and Goliath image of tiny boats attacking a leviathan battleship or cruiser, an idea that had a great appeal in some naval circles. Rather than a Jutland-style fleet engagement with battle lines slugging it out at long range, Navy planners envisioned swarms of torpedo-launching boats attacking out of the darkness to ambush a fleet en route to their Jutland. Unarmored, barely armed, 50-ton boats would waylay 30,000–40,000-ton ships with barrages of torpedoes and slip away unscathed and unseen. Destroyers and submarines would further attrite the enemy fleet with their own torpedoes. The main battle fleet would then move in to pick off the surviving enemy ships.

That was the theory. The reality was rather different. The small boats could be detected and enemy ships responded with intense automatic weapons fire, star shells, and spotlights to blind and illuminate the boats, and executed evasive maneuvers, generated smoke, and deployed their own patrol craft and destroyers to counter the torpedo boats. In fact, destroyers originated as "torpedo boat destroyers" in the 1880s. The darkness itself, which torpedo boats relied on to cloak their approach, made target detection and ranging difficult for the boats and foul weather hampered their finding targets as well as affecting their speed and maneuverability. At the same time as torpedo boats were being deployed, ships were installing drastically increased armament for another emerging threat, aircraft, and these rapid-fire and automatic weapons were ideal to counter

The classic image of a PT boat at speed, its bow rising and a broad wake as it cuts through the water. PT 73 was a 78ft Higgins in the PT 71–94-class, the first Higgins class made in any numbers.



A motivational poster encouraging lumbermen and mill workers to increase production. The actual PT 34 of MTBRON 3 evacuated part of General MacArthur's party from the Philippines and was later sunk by Japanese aircraft.

torpedo boats. Other new systems were also being introduced that improved the early detection of PT boats: surface radar, and sonar, which could detect high-speed surface craft. The small boats came to be considered expendable, an acceptable tradeoff, a little boat and a few men for a high-payoff target like a capital ship.

Few American PT boats scored hits on major ships. Instead they proved themselves invaluable for a whole range of mostly unforeseen missions. They did indeed occasionally attack large ships, but these missions were rare and confounded by often defective torpedoes. Real-world PT boat missions were so varied and numerous that it is almost impossible to list them all. Examples include: general patrolling; anti small craft operations, and barge hunting; "flycatcher" patrols intercepting island-evacuation efforts; picket patrols of anchorages and bases; escorting and guiding landing craft and other small craft; harassing shore installations; machine gunning fuel and ration drums dropped from passing Japanese destroyers to float ashore; antisubmarine patrols; interdicting suicide speedboats; scouting ahead of and screening larger formations; shadowing enemy ships to report activities or find bases; deception operations and diversionary demonstrations; ferrying troops to transfer to landing craft; transporting VIPs; delivering critical parts or specialist personnel; performing courier services; radio relay; inserting and recovering raiders and reconnaissance teams; charting unknown shores and channels; re-supplying coast-watchers; acting as air guards to recover downed aircrew; search and rescue; occupying inlets and atolls, preventing their use as refueling rendezvous for enemy submarines and seaplanes; and more.

The classification code for the patrol torpedo boat was PT, or Peter Tare using the era's phonetic alphabet, but it was a craft with many names. They were also known as motor torpedo boats (MTB), a term applied mainly to PT boat units – motor torpedo boat squadron (MTBRON), or simply "RON-Seven." MTB, a term of British origin, was little used as it sounds odd to

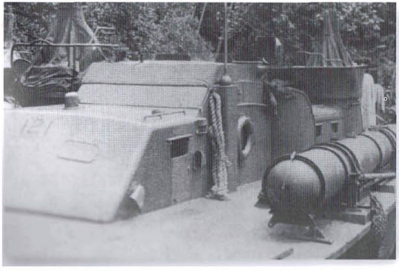
American perceptions; "of course anything that goes that fast obviously has a motor." Other common nicknames were "mosquito boats," describing their high-speed buzzing and ability to flit about; "nighthawks," in reference to their nocturnal missions; "barge-busters," describing what became one of their main roles; and "plywood boats" or "plywood battleships" (although they were not entirely made of plywood). The Japanese called them "devil boats" (*Akuma no Gyoraitei*) owing to their swift striking power and "green dragons" (*Midori no Ryu*) due to their camouflage. The Chinese called them "wind-thunder boats." The Germans, who experienced them in the English Channel and the Mediterranean, tagged them as *Schnelltorpedoboot* or S-boot, meaning fast torpedo boat. In fact, the Navy reclassified PT boats as patrol torpedo boats, fast (PTF) in 1962.

PT boats were not named, but assigned Bureau of Ships (BuShips) hull numbers. Officially a PT boat was named "USS PT 43," for example. They were commonly referred to by their hull numbers, "Thirty-seven Boat" or "One-One-Five Boat." Many boats were given nicknames by their crews, although they were seldom marked on the boat as were bomber nicknames. A sampling gives an idea of nicknaming trends: PT 108 – "Plywood Bastard"; PT 124 – "Who-Me"; PT 129 – "Artful Dodger"; PT 130 – "New Guinea Krud"; PT 132 – "Little Lulu"; PT 133 – "New Guinea Ferry"; PT 190 – "Jack O' Diamonds"; PT 134 – "Eight Ball"; PT 144 – "Southern Cross"; PT 152 – "Lack-a-Nookie"; PT 155 – "Rapid Robert"; PT 157 – "Old Aces & Eights"; PT 191 – "Bambi"; PT 196 – "Shamrock"; PT 321 – "Death's Head"; PT 326 – "Green Harlot"; PT 332 – "Black Hawk"; PT 337 – "Heaven Can Wait"; PT 338 – "Gray Ghost"; PT 347 – "Zombie"; PT 350 – "Shifty Fifty"; PT 363 – "Ace's Avenger"; and PT 492 – "Impatient Virgin."

The port side of PT 121, an 80ft Elco PT 103–196-class. Two unusual aspects of its marking are the black hull number and the boat's nickname, "SNAFU", which were seldom applied. The forward ports are painted over for blackout purposes. The running lights (beside the open side port) were often disconnected to prevent them from being accidentally turned on.

DEVELOPMENT

The self-propelled torpedo was invented in Britain in 1866 and was intended to be launched from shore as a coastal defense weapon. The first torpedoes were slow and short-ranged, driven by compressed air. By the late 1870s improved motors increased the range and speed and then gyro-stabilizers were introduced. They were not unlike modern torpedoes. During this same period the first torpedo boats were launched to take the torpedo to sea. These first torpedo boats were very different to those of World War II. By the 1890s they were 85–150ft in length, narrow steel-hulled, 50–100 tons, low-profiled, and steam-powered to 20–30knots. They mounted light guns and two or three torpedoes. They were *the* means of launching torpedoes, as the submarine was still in its infancy, untested and distrusted. Even at this early stage, the concept behind their use was basically the same as during World War II: trading off small boats for a capital ship was considered well worth the cost. Torpedo boats were a proven threat and all navies developed means to counter them. The torpedo boat destroyer made its appearance



in the late 1880s. They too mounted torpedoes and were soon performing screening, scouting, and escort duties and would become simply known as destroyers.

With the introduction of the internal combustion engine, a new form of torpedo boat appeared after the turn of the century. These were wooden, 50–100ft boats capable of 30–50knots and mounting two to four torpedoes plus machine guns. They were used through World War I and with further improvements in engine, torpedo, and boat design many countries were testing new boats in the 1930s. The US Navy began to seriously consider such boats in 1937; prototypes were not built until 1940, and the first testing was conducted in 1941.

Storm damage to PT 107's charthouse. The "plywood boats" were remarkably resilient and repairs, whether caused by battling the enemy or the elements, required little time.

The Navy originally developed three designs, two from established naval architects and one by the Navy's own BuShips. PT 1–8 were built from these designs. After extensive testing they were found inadequate. Some had unacceptable aft-launched torpedoes. The US had little experience in designing such craft. In the meantime the Electric Boat Company, Elco Naval Division of Bayonne, New Jersey, purchased a British 70ft MTB.[1] The preliminary testing of PT 9, which was built following the British design, led to Elco receiving a contract in 1940 to build PT 10–19.

The new boats were still too lightly constructed to withstand the rigors of the open sea. It was also realized that the boats' 70ft length was insufficient for the longer US torpedoes. However, the Navy was convinced of the need for these small attack craft. The overall length was increased and the hull re-engineered to withstand heavier seas and carry more armament. Elco was again awarded a contract to build PT 20–44 and the length increased to 77ft. Some of these boats were the first to see action, at Pearl Harbor and in the Philippines.

While Elco was building the new boats, two other companies were developing PT boats at their own expense: Higgins Industries at its City Park Plant in New Orleans, which was noted for its landing craft development and production; and Huckins Yacht Works at Jacksonville, Florida. Higgins was developing a 76ft design and Huckins a 72ft rival. Other companies had built trial boats, such as Fogal Boat Yard in Miami (PT 1 and 2) and Fisher Boat Works in Detroit (PT 3 and 4). BuShips built the strong, but inadequate aluminum-hulled PT 8. In May 1941 the Navy specified the "dream boat" as 75–80ft in length, equipped with four 21-in. torpedo tubes, two 20mm guns on power-operated mounts, two twin power-operated .50-cal. machine guns, smoke generator, radio, self-sealing fuel tanks, significant ammunition load, top speed of 40knots, 200-mile cruising range at 20knots, two days' rations, and five days' emergency rations. The "Plywood Derby," a grueling 190-mile course, was held off New York in July 1941 to determine which design the

1 See Angus Konstam, New Vanguard 74, *British Motor Torpedo Boat 1939–45*, Oxford: Osprey Publishing (2003)

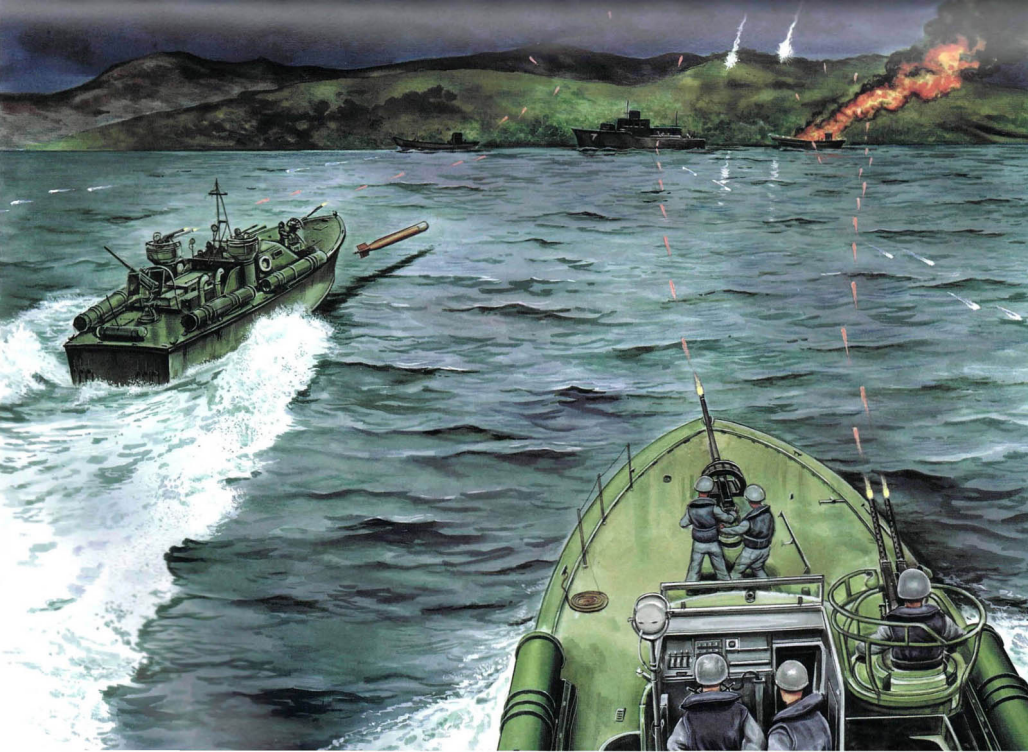
INVENTORY OF US-BUILT PT BOATS

Year	Length	Make	Class	US	USSR	UK	Total
1940	various	various	1–19 (exp)	1	--	18	19
1941	77ft	Elco	20–68	39	--	10	49
1941	72ft	Huckins	69 (exp)	1	--	--	1
1941	76ft	Higgins	70 (exp)	1	--	--	1
1942	78ft	Higgins	71–94	14	4	6	24
1942	78ft	Huckins	95–102	8	--	--	8
1942	80ft	Elco	103–196	94	--	--	94
1943	78ft	Higgins	197–254	56	1	1	58
1943	78ft	Huckins	255–264	10	--	--	10
1943	78ft	Higgins	265–313	31	18	--	49
1943	80ft	Elco	314–367	54	--	--	54
1943	70ft	Scott-Paine*	368–371	4	--	--	4
1943	80ft	Elco	372–383	12	--	--	12
1943	70ft	Vosper	384–449	--	50	16	66
1944	78ft	Higgins	450–485	36	--	--	36
1944	80ft	Elco	486–563	78	--	--	78
1944	70ft	Higgins	564 (exp)	1	--	--	1
1945	80ft	Elco	565–624	58	--	--	58
1945	78ft	Higgins	625–660	9	23	--	32
1945	70ft	Vosper	661–730	--	32	--	32
1945	80ft	Elco	731–790	--	30	--	30
1945	78ft	Higgins	791–802†	--	--	--	--
1945	80ft	Elco	803–808†	--	--	--	--
1945	70ft	Vosper	(no number)	--	8	40	48
1951	various	various	809–812 (exp)	4	--	--	4
Total				511	166	91	768

exp = experimental * Canadian-built. † Canceled with the end of the war.

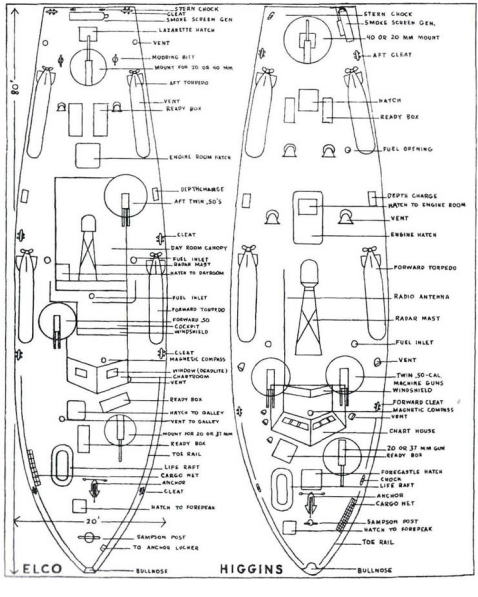
TORPEDO ATTACK

A pair of Elco 80ft boats charge Japanese coastal craft hugging an island's shore in the Solomons, 1943. An Ab-tai armored patrol boat and two *Daihatsu* barges are silhouetted by mortar illumination rounds as the barge-busters close in for the kill. Usually groups of two or three boats hunted together. Sometimes five or more would hunt and spread out to intercept infiltrating barges. Once the shooting started the other boats would rush in to aid in the kill and look for other barges as they traveled in small strung-out convoys. In action it took two men to handle the boat, one to steer and the other to work the throttles. While the PT cockpit had some light armor, the boats were otherwise unprotected. Helmets were worn in action, as were kapok life vests. While cumbersome, they offered better floatation than inflatable vests, were less susceptible to flames, and provided a degree of splinter and flash-burn protection. For want of better targets, the PT boats commonly expended "fish" on comparatively small targets in hopes of a strike, which seldom occurred. A torpedo stuck in the tube at launch was a "hot run." The turbine would run at high speed unimpeded by water, creating tremendous heat and if not stopped the super-heated torp would disintegrate. If it ran long enough the spinning props would arm it. A torpedo-man physically had to shut off the compressed air line, which required direct contact with the red-glowing potential bomb. The later roll-off racks eliminated this hazard.



An early Elco boat with its basic armament, four 21-in. torpedoes in Mk 18 Mod 1 tubes, two twin .50-cal. machine gun turrets, and a 20mm cannon on the fantail. Note the staggered .50-cal. turrets which serve to differentiate it from the Higgins, which had both turrets flanking the charthouse. Very early Elcos were configured the same way though.

Navy would accept. The Elco came out on top, followed by the Higgins then Huckins. Although Elco won first place, the Navy also saw merits in the other two boats. Because of the projected large numbers of PT boats and the limited number of boats each firm could build alongside their other contracts, it was decided to offer contracts to all three companies. Elco produced 385 boats, Higgins 199, and Huckins only 18 as training boats. Various modifications were made to the trial designs by all three firms and all were eventually lengthened. Modifications and improvements were applied during the war.



The topside differences between the basic Elco and Higgins boats. (From the Navy's "Know Your Torpedo Boat")

An 80ft Elco at moderate speed. A 6ft wooden dinghy, obtained by many boats for boat to shore movement, is on the forecastle. The SO radar mast is folded down to reduce the boat's profile.

Throughout World War II the PT boats underwent many transformations that enabled the original designs to be modified to fit the missions they were called on to perform. In March 1943 a replacement plan was implemented with the goal of building 96 boats a year. British-designed Vosper boats were built in the US for Lend-Lease to the USSR and Britain.

DESIGN

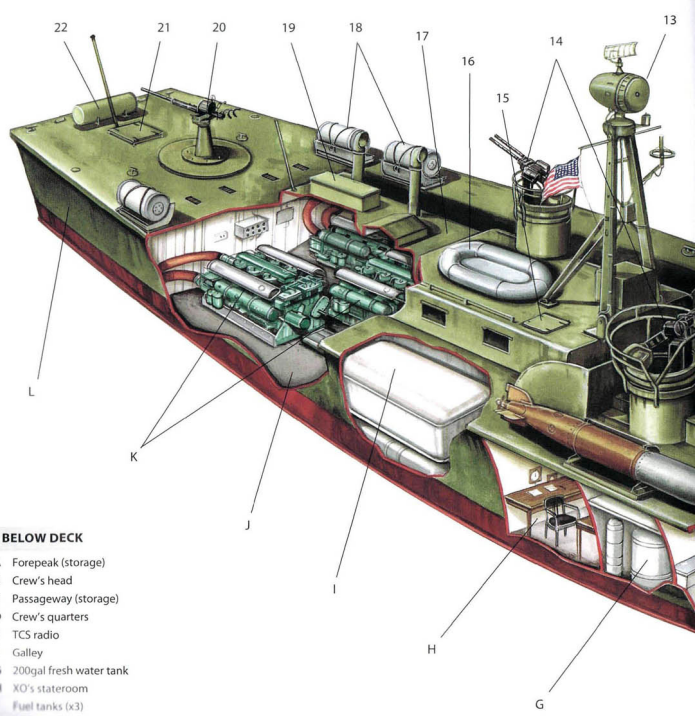
There were similarities in the layouts of the Elco and Higgins, but also differences between each class of boats built by the same manufacturer. Besides design differences there were handling qualities, capabilities, and limitations that may have been better or worse on one or the other. Overall the Elco was generally preferred over the Higgins. It had a wider foredeck and its underside design sprayed water outward more effectively, while the Higgins was a wetter boat taking much spray over the bow, even though its freeboard was higher. The Elco had a higher silhouette, but the staggered .50-cal. turrets provided better visibility and fire fans. However, the Higgins' hull structure was stronger and more durable than Elco's, but that was a tradeoff resulting in the Higgins being heavier by 20,000lb and slightly slower. The Higgins, though, had deeper draft forward and less in the stern than the Elco and coupled with its larger rudders it could make a tighter turn. Because of its slower speed, about 3knots less than the Elco, the tighter turning capability was negated. The Higgins achieved 150 nautical miles more range than the Elco at the same cruising speed. For long-range ferrying, rubber fuel bladders and 55gal drums were carried on deck. An important limitation suffered by the Elco was that its bow rode higher and at high speeds the forward guns could not fire dead ahead, being limited to 30 degrees on either side. The Elco's interior design and compartment arrangement was considered superior, but the Higgins was better suited for northern winter seas. When both designs were accepted it was demanded they make no less than 40knots; this was reduced to 39knots when additional equipment was required. The conventional wisdom held that smaller boats were preferable, banking on a small silhouette, lightweight construction, and high speeds for survival. As it was, it was fortunate the boats were more heavily constructed to withstand the hard pounding and were as large as they were to accommodate more and heavier weapons.

The following boat descriptions are generic in that there were minor changes between the

The engine room hatch of an Elco boat amid ventilators and ready ammunition lockers. Over one of the ready lockers is a canvas-covered .50-cal. machine gun on a pedestal mount.

B CUTAWAY ELCO 80FT PT BOAT

For its 80ft length and 20ft beam, the Higgins PT boat provided its 12- to 14- man crew with adequate if spartan accommodations. For comparison purposes this boat is shown with both 21-in. Mk 18 Mod 1 torpedo tubes and a 22.5-in. Mk 1 Mod 1 roll-off rack. It would have one or the other. The aft tubes have been removed for a pair of depth charge racks on either side. The athwartship waterproof bulkheads are identified by the number of feet aft from the bullnose (bow). See plate for full details.

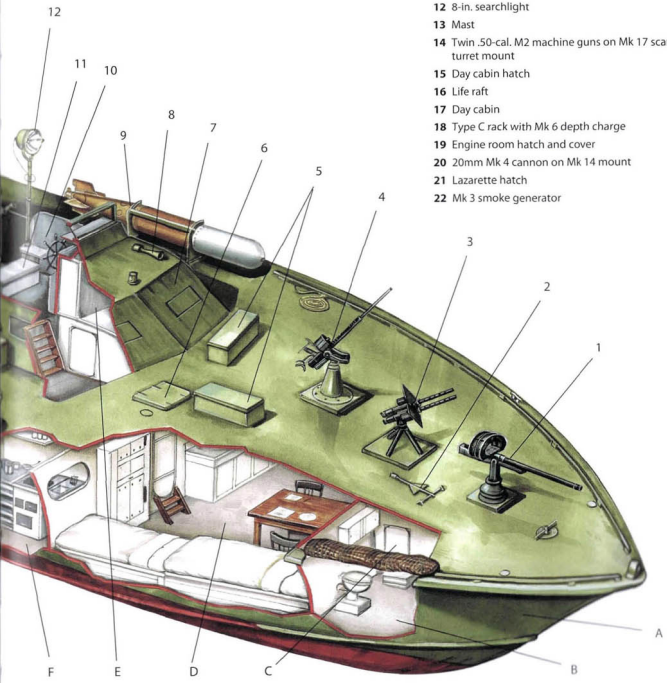


BELOW DECK

- **A** Forepeak (storage)
- **B** Crew's head
- **C** Passageway (storage)
- **D** Crew's quarters
- **E** TCS radio
- **F** Galley
- **G** 200gal fresh water tank
- **H** XO's stateroom
- **I** Fuel tanks (x3)
- **J** Engine room
- **K** Packard 1,200bhp 4-M2500 engine (x3)
- **L** Lazarette, auxiliary tiller, ammunition

TOPSIDE

1. 37mm M4 gun on Mk 14 mount
2. Anchor
3. Twin .50-cal. M2 machine guns on pedestal mount
4. 20mm Mk 4 cannon on Mk 14 mount
5. Ready ammunition locker
6. Crew quarters hatch
7. Charthouse
8. Horn
9. Mk 1 Mod 1 roll-off rack with 22.5-in. Mk 13 torpedo
10. Cockpit/helm
11. Signal locker
12. 8-in. searchlight
13. Mast
14. Twin .50-cal. M2 machine guns on Mk 17 scarf ring turret mount
15. Day cabin hatch
16. Life raft
17. Day cabin
18. Type C rack with Mk 6 depth charge
19. Engine room hatch and cover
20. 20mm Mk 4 cannon on Mk 14 mount
21. Lazarette hatch
22. Mk 3 smoke generator



This 80ft Elco mounts an excessive array of weapons: On the bow off the photo is a 37mm M4 automatic gun. Just aft of the crew quarters hatch is a twin .50-cal. M2 machine gun, and then a 20mm M4 cannon. Forward of the two 22.5-in. Mk 13 torpedoes are 4.5-in. M8 barrage rocket launchers, each with 12 rockets. Atop the charthouse is a 60mm M2 mortar for illumination.

different classes and versions of either make. From stem to stern the PT boats were kept as uncluttered and as free of superstructure as possible. The deckhouse was low and small to reduce the silhouette. Any deck "clutter" was caused by armament, which crowded the deck. The interior was designed to make the maximum use of what little space was available. (Note: starboard = right, port = left – as an aide memoir both "port" and "left" are four letters).

80ft Elco

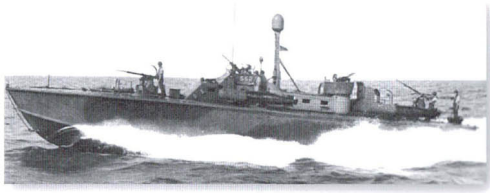
As built, the forecastle was clear of fixtures other than a tiny rope locker hatch, crew quarters access hatch, 50lb anchor, and a second hatch immediately forward of the charthouse. A 37mm and/or 20mm gun would be retrofitted as might machine guns and other armament. Ammunition ready lockers would be added. The charthouse had two small rectangular ports forward and a horn on top. On the starboard side of the charthouse was a twin .50-cal. machine gun turret. To its port was the cockpit with the helm, torpedo director, 8-in. searchlight, and radio antenna. Between the helm and the turret was an access hatch to the charthouse. There was also a locker for the multi-purpose light, blinker gun, semaphore flags, and other signal devices. The dayroom cabin to aft mounted the folding mast with navigation lights, and when retrofitted, the radar antenna. Atop the forward starboard corner of the dayroom was a hatch. On the aft port corner was the other .50-cal. turret and a vent on the opposite corner. An access hatch was set in the aft bulkhead. Immediately abaft of it were the engine room access hatch, four ventilators, and two 20mm lockers. These fixtures were all set on a large removable engine room hatch cover, allowing the engines to be replaced. Abaft of this on the fantail was a 20mm gun, lazarette access hatch, and the smoke generator. Many crews fitted steel watertight 20mm ammunition boxes topside for weapon and torpedo tools, making them more accessible. A 6ft oval life raft (canvas-covered balsawood) was stowed on the forecastle, but with guns added it was stowed atop the charthouse or day cabin. Later a 6ft wooden dinghy was provided to many boats and stowed on the day cabin. Found all about the deck were bitts, cleats, chocks, small vents, and deadlights (glass blocks set flush in the deck to provide daylight below).

Below deck each compartment's athwartship (crossways) watertight bulkhead had a watertight door. In the very bow was the forepeak with the rope locker. The head on the port side contained two sinks, a flush toilet and

pump, and a spare anchor. After flushing, the valve had to be turned off or the boat would flood. To starboard was a passageway over which was the deck access hatch. Here another spare anchor, canned food, soap, and toilet paper were stowed. The crew's quarters had four bunks to a side, lockers, and a center table with folding leaves. In the next compartment was the XO's room to port and the galley to starboard. It contained a refrigerator, freezer, stove, sink, counter, food, and utensil stowage. Aft of the XO's stateroom was the officers' head and then the CO's room. Both were connected directly to the head. In the center was a small compartment with a 200gal fresh water tank and the wardroom to starboard and then a storage room for equipment and four days' rations. Next was a compartment with three tanks containing 3,000gal of aviation fuel. The chartroom contained the radio, radar screen, chart table and drawers, navigation plotting equipment, signal gear, etc. Aft of the helm was the crew's dayroom accommodating two bunks. It was also a work area and held stowage lockers. Aft of the dayroom and fuel tanks was the engine room with the three big Packards. The 1/2-kW water-cooled or 5-kW air-cooled electric power generator and four 6-volt storage batteries were here also. In the very stern was the lazarette (sternmost compartment) containing the steering gear and the auxiliary tiller. Oil cans, paint, and other engine room gear were stowed there along with ammunition. The engine exhaust and mufflers were on the stern transom. There was a CO2 fire extinguisher system for the engine compartment and fire extinguishers stowed all about the boat. Length: 80ft, beam: 20ft 8in., draft: 5ft 3in., displacement: 56 tons.

78ft Higgins

Higgins boats were laid out somewhat differently. On the forecastle were two below-deck access hatches. The after of the two was centrally located and, since the charthouse was located farther forward than on an Elco, space was limited for retrofitted guns, which had to be mounted on the port side just forward of the charthouse. The anchor and life raft were also stowed on the forecastle. The centerline hatch was relocated just forward of the charthouse on later versions, allowing a gun to be mounted in the center and the life raft stowed on the engine removal hatch. On the aft bulkhead of the charthouse were the helm to port and a hatch to starboard, along with the 8-in. searchlight and radio antenna. The small folding mast was here too, and had to be replaced with another farther aft when radar was installed. There were six rectangular ports in the forward bulkhead of the charthouse and two on the sides. The charthouse was flanked by two twin .50-cal. machine gun turrets. Inboard of the starboard turret was a hatch into the wardroom. Abaft



PT 552, a Higgins of the PT 486–563-class, has a second 20mm Mk 4 cannon mounted on the forecastle. The forward 20mm would have a lighter mount than its aft brother.

ABOVE
The galley of PT 796, a 78ft *Higgins PT 791–802-class*. In Higgins boats the galley was part of the crew's quarters. The cook's helmet, canteen, and "Mae West" life jacket, the three items one took to action stations, wait in readiness for "general quarters." (Ron McKenna)

ABOVE RIGHT
An officer's stateroom aboard PT 796. The rooms were fitted with a bunk, deck, book shelf, and lockers. A battle lantern is opposite the cockpit access ladder. Several were hung throughout the boat on standby for emergency lighting. (William Enestvedt)

the charthouse on the centerline were a fuel tank removal hatch and a larger engine removal hatch with an insert man-hatch. Another fuel tank removal hatch was on the fantail forward of the 20mm gun along with ammunition ready boxes and a hatch to the lazarette. The smoke generator was located on the port stern. There were five scoop vents forward of or beside the charthouse and six amidships. Later versions had the fantail rearranged to accommodate two guns.

The forepeak was larger than the Elco's, allowing for more storage. The crew quarters too were larger, accommodating all ratings; there was no day cabin. In the aft of the crew quarters were the galley to port and the head to starboard. Beneath the charthouse to either side were two officers' staterooms both doubling as the wardroom. The forward fuel tanks were just abaft the machine gun turrets with the officer's head between them. The engine room was large and farther forward than on Elcos. Aft of this was the main fuel tank and then a large lazarette for the auxiliary tiller and stowage and equipment. Length: 78ft 6in., beam: 20ft 1in., draft: 5ft 3in., displacement: 54 tons.

Construction

In the late 1930s much was learned with regard to hull design, first using 1/12th scale models and then by constructing test boats in various forms. The early boats were influenced by high-speed racing boats and the rum-runner boats of the late 1920s and early 1930s, but these were intended for calm waters and were not loaded down with armament, large crews,

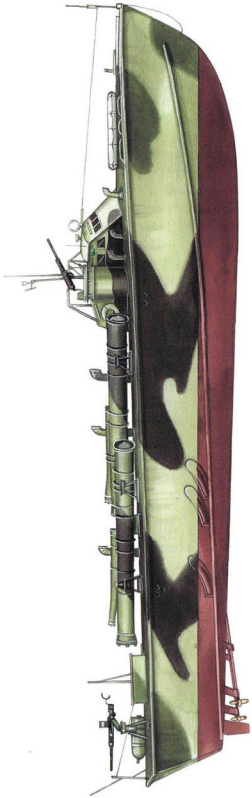
C

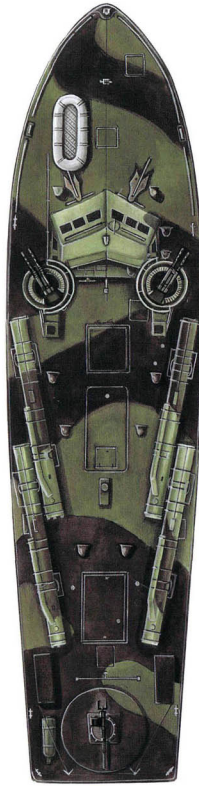
HIGGINS 78FT PT BOAT

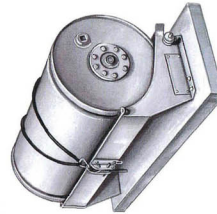
This Higgins 78ft boat of the PT 277–288-class is armed with two .50-cal. machine gun turrets, a 20mm Mk 4 cannon, and four Mk 18 torpedo tubes. Note the location of the exhaust mufflers on the sides, as opposed to the stern transom on Elco boats. This boat is painted in the Measure 31 dark scheme intended for offshore operations. The hull was painted with dull black and either medium or dark green, while the deck and superstructure were deck green and black. Camouflage scheme instructions usually did not specify exact shades of any color, but what was best suited for the area of operations.

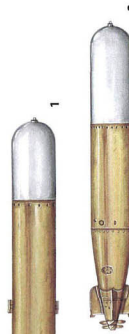
Inserts: The old 21-in. Mk 8 torpedo (**1**) was used through the war, but had begun to be replaced by the 22.5-in. Mk 13 torpedo (**2**) in late 1942. The two props were four-bladed and counter-rotating. Torpedoes were shipped in robust heavy gauge steel containers with round noses. The Mk 6 depth charge is shown on the Type C individual release rack (**3**) of which two to eight were mounted on some boats.

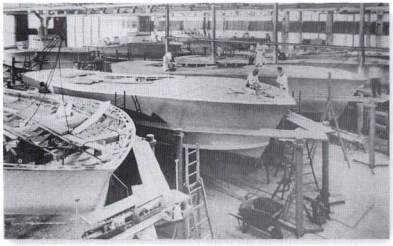
C HIGGINS 78FT PT BOAT











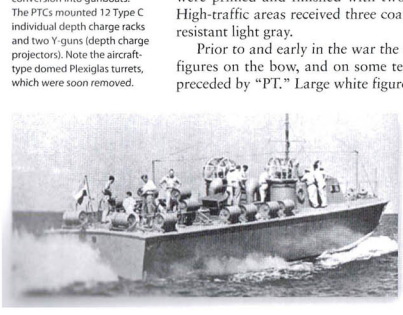
PT boats take shape at the Higgins plant in New Orleans. Higgins was the largest employer in the state of Louisiana.

and accommodations. While an aluminum hull was tested, wood proved to be stronger. Most early boats were less than 70ft, but it was found that 77–80ft hulls offered more stability and space for armament. The hulls were also wide, 20-plus feet and drew over 5ft of water when motionless. The underside was noticeably concave up to the chine and the sides slopped gently outward. The framing was laminated mahogany, spruce, or oak spaced at 1ft intervals through its length. Several athwartship bulkheads of two layers of plywood with watertight doors compartmentalized the hull. The 1 x 6-in. mahogany hull planking was fastened using brass screws and the planks were angled on a bias. Over this was ironed on glue-impregnated airplane fabric and then a second layer of planks was fastened running at an angle opposite to the first. The hull was surprisingly resilient. The deck was a single layer of planks running lengthwise over the framing and reinforced by strongbacks beneath weapons stations. The deckhouse, day cabin, and machine gun tubs were wood frames covered with 3/8-in. birch or fir plywood on both sides of the framing. The cockpit was protected by the only armor on the boat, other than 20mm gun shields, which were sometimes removed. To demonstrate where a crew's priority lay, some added steel plating to protect the refrigerator. Self-sealing fuel tanks were not available until late in the war and in some cases armor was retrofitted to protect the outboard tanks. It required six to eight weeks to build a boat from laying the keel to launching, and another three or four weeks of fitting before commissioning.

Boats were painted with two coats of haze gray and a third coat of the prescribed camouflaging colors, while the deck had two coats of non-skid deck paint and was finished with the camouflage colors. The underside was painted with three coats of red copperoid enamel, and all interior surfaces were primed and finished with two coats of fire retardant white enamel. High-traffic areas received three coats. The engines were painted with heat-resistant light gray.

Prior to and early in the war the hull number was painted in large white figures on the bow, and on some test boats on the side of the charthouse, preceded by "PT." Large white figures were conspicuous at night. "PT" was deleted and the numbers were made smaller. If camouflage-painted the number was often in one of the lighter colors. Many PT boats lacked bow numbers altogether, with only a small number on the forward charthouse bulkhead, on the charthouse sides, and sometimes one on the stern transom or the aft 20mm pedestal. Sometimes the white numbers were done in the black shadow form.

An Elco patrol torpedo antisubmarine boat of the PTC 1–12-class. Unable to adapt sonar to "hear" through its own engine noises, the project was canceled and the boats were transferred to Britain for conversion into gunboats. The PTCs mounted 12 Type C individual depth charge racks and two Y-guns (depth charge projectors). Note the aircraft-type domed Plexiglas turrets, which were soon removed.



The two components of the Collins TCS radio: the transmitter (left) and receiver (right). This was the standard transceiver on PT boats.

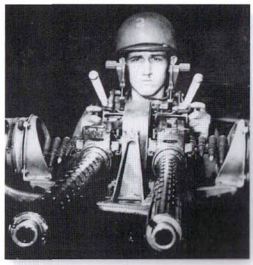
Signals

PT boats had only limited long-range communications capabilities, a single Collins TCS radio, widely used aboard other small craft. This was an AM set capable of voice or manual continuous wave (Morse code) transmission on 1.5–12.0 MHz frequencies. The 20ft whip antenna was mounted near the helm. It was used in the VHF mode to limit its range to the horizon. It could transmit up to 70 miles, and traffic was kept to a minimum to avoid enemy detection and interception. Originally, one boat per division was equipped with a radio direction finder, but later all were so fitted. The finder was mainly used to locate other boats at night when they became separated. Night and day communications between boats was critical and several visual means were provided: blinker gun, multi-purpose light, searchlight, and semaphore flags. The searchlight could transmit blinker signals by means of a code key in the cockpit.

Boats did not initially have radar, but it was recognized as being essential for detecting surface targets (battleship 25 miles, carrier 20 miles, destroyer 10 miles, surfaced sub 5 miles), aircraft up to 15 miles, surface obstacles; torpedo aiming, and navigation. Raytheon SO-series radar sets began to be added in 1943, first one per division and then to all boats. Improved SJ radar was fitted on later boats. Boats were also later fitted with electronic friend-or-foe identification (FFI) devices. The main means of daylight FFI was the boat's silhouette and a small American flag on the mast. Occasionally a white star on a blue roundel was painted atop the chartroom or day cabin.

Armament

The original PT boat armament was primarily designed around its main armament: four torpedo tubes. Secondary armament was purely for air



FAR LEFT
A PT boat's two turrets were fitted with two .50-cal. aircraft-type M2 machine guns on a Mk 17 scarf ring mount.

LEFT
The business end of the twin "fifties." If one gun jammed it was imperative that it be immediately cleared or the aim, much less the volume of fire, was affected. .50-cal. ammunition types were identified by colored bullet tips: ball – plain; tracer – red or orange; incendiary – light blue; armor-piercing – black; armor-piercing-incendiary – silver; and armor-piercing-incendiary-tracer – silver with red band.

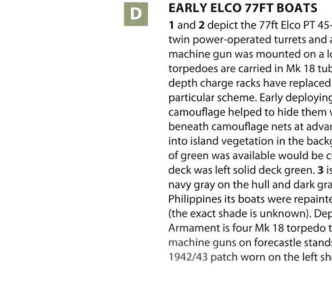
PT 564 was a one-off 70ft experimental Higgins boat. It mounts the SC radar, which began to be installed in late 1943. It is armed with four 22.5-in. Mk 13 torpedoes on Mk 1 Mod 1 roll-off racks.

defense: two pairs of .50-cal. machine guns in turret mounts and a 20mm gun on the fantail. Early Elcos had only .50-cals. Some boats mounted one to four .30-cal. Lewis guns.

By 1943 the real role of PT boats was recognized and it was not sinking capital ships with torps. Small craft and barges were their targets and these shallow-draft vessels were either immune to torpedoes or it was not worth expending torpedoes on them. More potent high-explosive-firing automatic weapons were needed, something beyond the ".50-cals" and "20 mike-mike." PT boats were becoming high-speed gunboats bristling with weapons. In the search for additional armament, some PT boat bases and the crews used their own initiative, resulting in some odd and imaginative arrangements. However, as the demand for additional firepower was recognized, new boats came off the slips with more and bigger guns. There were so many that the barrels were often kept elevated vertically to ease movement about deck. These additional weapons, ammunition, and crew added a great deal of weight and could affect the boats' performance. Something had to go and often the two after torpedo tubes/racks, if not all four, were removed. Decks had to be reinforced to support the pounding weapons' weight and as a result a quarter of a PT boat's weight was armament and ammunition.

A 40mm M1 antiaircraft gun on an M3 mount fitted to the fantail of PT 617. The forward ready rack held this barge-killer's four-round clips.

Regardless of heavier armament, the .50-cals were still valuable weapons and additional guns were often mounted on single and twin pedestal mounts, usually on the forecastle. The Browning M2 aircraft gun was used. The fixed model, as used in aircraft turrets and wing mounts, was set in PT boat twin turrets. The



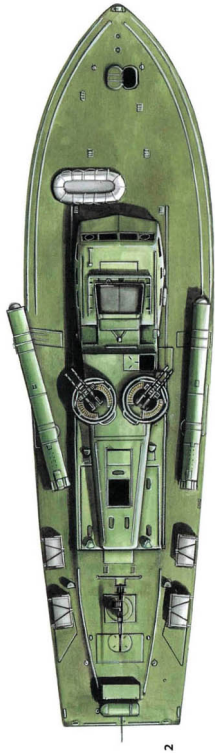
D

EARLY ELCO 77FT BOATS

1 and **2** depict the 77ft Elco PT 45–68-class. Standard armament for these early boats was two twin power-operated turrets and a 20mm Mk 2 cannon on a Mk 4 mount. Often a twin .50-cal. machine gun was mounted on a low pedestal mount in the center of the forecastle. Two Mk 8 torpedoes are carried in Mk 18 tubes, the port tube cranked outboard for launching. Two Type C depth charge racks have replaced the aft torpedo tubes. The camouflage pattern follows no particular scheme. Early deploying boat crews designed their own when it was realized that camouflage helped to hide them when moored beneath shoreline overhanging vegetation and beneath camouflage nets at advanced bases, and when viewed from the surface they blended into island vegetation in the background on the narrow seas of the Solomons. Whatever shade of green was available would be cut with white primer or thinner to create different shades. The deck was left solid deck green. **3** is an earlier 77ft Elco of the PT 20–44-class, in its original light navy gray on the hull and dark gray on the deck and topsides. After MTBRON 3 arrived in the Philippines its boats were repainted in Measure 1–all dark gray, and in early 1942, all green (the exact shade is unknown). Depth numbers above the water line were black and white below. Armament is four Mk 18 torpedo tubes, two twin .50-cal. turrets, and two Lewis .30-cal. M1917 machine guns on forecastle stands, sometimes in twin mounts. The insert insignia is an unofficial 1942/43 patch worn on the left shoulder by some enlisted men.

D EARLY ELCO 77FT BOATS

1



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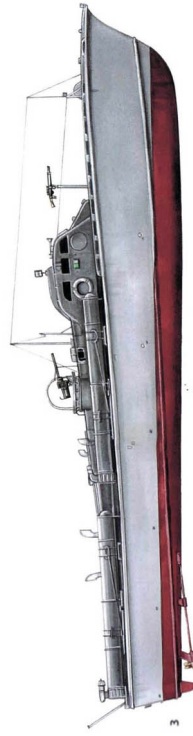


3

A boat's officer mans a 20mm Mk 4 cannon on a lightweight Mk 14 mount. These low mounts were less than effective for antiaircraft use, although they could be so employed, but the gunner was squatting on the deck. Such mounts were intended for surface targets.

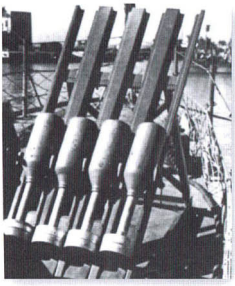
flexible model with twin spade grips was fitted to pedestal mounts. The aircraft gun differed from the heavy barrel ground gun by having a ventilated barrel jacket and a higher rate of fire, 750–850rpm as opposed to 450–575rpm. Ball, armor-piercing, incendiary, and tracer ammunition were available–usually one AP to one tracer. The belted ammunition was fed from 110-round boxes, or in the case of the twin turrets, a 500-round ammunition bin on either side. The guns had a 1,000–1,400yd effective range. Up through to PT 44, powered turrets with a Plexiglas domed housing were used, but deployed crews removed the hot, vision-restricting domes and cut the power lines as they could not pressurize the hydraulics if the engines failed.

Lewis .30-cal. M1917 machine guns used a 47-round pan magazine and fired 500–600rpm. Used on early boats, their 700yd effective range and limited penetration contributed to their rapid demise. They were usually mounted on either side and forward of the cockpit. In some cases Browning .30-cal. M1919A4 machine guns were fitted on pipe-stem mounts to port and starboard just forward of the cabin or on the sides. These belt-fed guns fired 400–550rpm.

The 20mm Mk 2 and Mk 4 automatic cannons were fitted to a pedestal mount with a shield. The Swiss-designed Oerlikon was an effective weapon capable of hammering out 550rpm at up to 2,000yds. The eight 60-round snail drum magazines could be loaded with HE, HE-I, HE-T, and AP-T[2], usually one HE to one HE-T. Besides the usual fantail position, an extra gun on a lighter mount and without a shield was often fitted on the port beam of the forecastle. Elco developed an armored quad mount with a seat for the gunner, called the "Thunderbolt." It was mounted on the fantail of a few late-war boats in lieu of the 40mm.

When the main targets of the Peter Tares became barges, a different kind of main armament was sought and it needed to be mounted on the forecastle to maximize the fan of fire. Aft-mounted guns were well suited for antiaircraft use, but could not fire forward at surface targets. Sometimes a 20mm cannon was mounted on the forecastle as were additional .50-cals. Two heavier weapons were available, though. The Army's 37mm M3A1 antitank gun had its two wheels removed and the shielded gun with its spread trails was mounted on a timber base. It was only a single-shot weapon with a 1,000yd range, but it could crack off 15-20rpm. Both HE and AP-T ammunition were available. The preferred 37mm was the Colt-Browning M4, which was designed to be mounted in the nose of Bell P-39 Aeracobra fighters. The first guns were recovered from battle-damaged aircraft, but they were later acquired through Army Air Forces channels and became standard in some squadrons. Locally fabricated mounts were built for this full-automatic that pumped out 150rpm. It was fed by an unusual 30-round non-disintegrating, endless belt held in an oval "horseshoe" magazine with alternating HE-T and AP-T rounds, which were smaller than those of the M3A1, but achieved a similar range. In early 1945 some boats received the improved 37mm M9 gun.

2 HE = high-explosive, AP = armor-piercing, I = incendiary, T = tracer



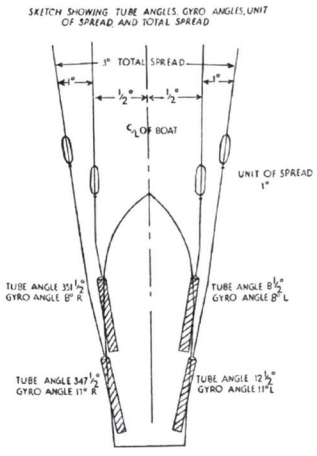
FAR LEFT
A 7.2-in. Mk 20 Mousetrap anti-submarine rocket launcher. One to four launchers were mounted on some boats operating in the Mediterranean. The rockets were fired at a rate of one every three seconds. The 65lb rockets contained 33lb of Torpex explosive.

LEFT
A variety of armament can be seen at an MTB base, including a 4.5-in. Mk 8 barrage rocket launcher above the Mk 13 torpedoes. The torp bodies were often roughly painted green or gray so the bronze "fish" would not reflect sunlight or, at night, flares, gun flashes, or spotlights. The .50-cals in the foreground are fitted with Mk 1 flash eliminators.

The Swedish-designed Bofors 40mm M1 antiaircraft gun on an M3 mount was yard-mounted on the fantail of later PT boats and retrofitted on others. This was an Army weapon and unlike the heavier Navy marks with powered mounts and water-cooling jackets, the M1 was manually laid and air-cooled. It was fed by four-round clips to spit out 120rpm. Its range was up to 5,000yds, but effective range was closer to 2,000yds against surface targets. Ammunition included HE, HE-T, HE-I, AP, and AP-T. A two-man crew was required for the 20mm and 37mm guns, although in a pinch one man could manage. The 40mm required three or four men. The 37mm M4 gun's HE-T round only made a 3-in. hole in a barge while the 40mm blew a 12–14-in. hole. While not as effective as the 40mm, the 37mm was liked as it was much lighter and more compact, allowing it to be easily mounted on the forecastle.

Armament arrangements were many and varied. By early 1944 South Pacific boats were typically armed with a 20mm on the forecastle and fantail (the later sometimes replaced by a 40mm), two twin .50-cal. turrets, a single or twin .50-cal. on either side between the torpedoes, two individual depth charges racks, often a 37mm forward, and possibly even more machine guns. The 40mm was commonly retrofitted on Southwest Pacific boats in late 1943, but the aft two torpedo tubes had to be removed. In the South Pacific the torpedoes were retained owing to the chance of destroyer contact, although none were encountered after August 1/2, 1943. The 40mm was little used there, with the lighter 37mm being preferred. In 1944 some production boats armed with the 40mm were received in the South Pacific, but even in 1943 at least three South Pacific boats were retrofitted with two 40mms.

Two 5-in. Mk 50 rocket launchers were mounted on some boats in 1945. The eight-tube launchers were fitted on either side just forward of the charthouse. They were mounted on arms that swung outboard for horizontal firing straight ahead. The high-velocity spin-stabilized rockets (HVSR) were barrage-fired at groups of watercraft or shoreline targets within 5,000yds, but usually closer. Range was estimated by first firing the forward 20mm with a similar trajectory. A barrage of the 50lb HE rockets would be devastating, and more powerful than a salvo from a 105mm howitzer battalion. However, the fact that the back blast jetted 200ft to the rear and 150 degrees to either side had to be taken into consideration. The after crew had to be undercover and the massive flash illuminated the boat.


SKETCH SHOWING TUBE ANGLES, GYRO ANGLES, UNIT OF SPREAD AND TOTAL SPREAD
5° TOTAL SPREAD
1°
1°
½°
½°
1°
℄ OF BOAT
UNIT OF SPREAD 1°
TUBE ANGLE 3½° GYRO ANGLE 8° R
TUBE ANGLE 8½° GYRO ANGLE 8° L
TUBE ANGLE 347½° GYRO ANGLE 11° R
TUBE ANGLE 12½° GYRO ANGLE 11° L

A diagram explaining the tube launch angles, pre-set gyro angles, and the spread of launched torpedoes.

Other rockets also saw use. A 4.5-in. Mk 8 barrage rocket launcher was sometimes mounted on the forecastle. This launcher rack held 12 x 29lb rockets with a range of 1,000yds, which could be launched in four seconds at a steep angle. There was also a Mk 13 launcher mounting six 2.36-in. M1A1 bazookas plus expedient two- and four-tube versions. Occasionally, in the Mediterranean Theater one to four Mk 20 Mousetrap racks were mounted on the forecastle. This anti-submarine weapon threw four 7.2-in. 65lb rockets 300yds ahead to contact-detonate on submerging subs. Commander, MTBRONs, Seventh Fleet recommended that all PT gun armament except the twin .50-cals be replaced by rockets to capitalize on their devastating firepower.

Unlikely weapons retrofitted to boats were the 81mm M1 and 60mm M2 mortars. An indirect fire mortar aimed from one moving craft at another had only a slim chance of hitting its target, considering the projectile's long, slow flight time, sea breezes, sea swells, and marginal accuracy. Mortars fired illumination rounds to light up surface targets. They were also used for harassing fire directed ashore. Both mortars were provided with HE, white phosphorus, and illumination rounds. The 81mm had a 3,290yd range and the 60mm reached to 1,985yds. A timber platform capable of absorbing the considerable recoil and sometimes additionally padded with sandbags, would be mounted to one side of the forecastle.

The old main armament still had its uses, as there was always a chance opportunity to take out a large ship. The first torpedoes were the 21-in. Mk 8 introduced in 1911. Most of the torps in use had been made in the 1920s and it was a challenge to maintain them. They were launched from a 20ft 8-in. long tube. To launch the "fish" the Mk 18 Mod 1 tube's fore end was manually trained outboard pivoting on its aft mounting; the forward tubes were set to 8 degrees and the aft 12 degrees. The tube was space consuming and heavy. A black powder charge expelled the torp and it was electrically fired from the cockpit, but a torpedo-man stood by to whack the manual backup striker with a mallet.

This 22.5-in. Mk 13 torpedo on a Mk 1 Mod 1 roll-off rack displays the bronze body, fins, and two counter-rotating props. The warhead was light gray. Many model kits and other illustrations often depict red warheads. This was never so. PT boat painting instructions stressed that no red would be displayed in any form. Friendly aircraft seeing even a hint of red immediately assumed it was a Japanese flag.

This stern view of an Elco boat displays its Mk 18 Mod 1 torpedo tubes, the Mk 3 smoke generator canister over the stern transom, and its weathered camouflage. Native guides can be seen on the fantail.

The shorter and lighter 22.5-in. Mk 13 was adopted in 1936 as the standard air-delivered torp. Difficulties were encountered in that mode, but when launched from PT boats it did not experience the dive for the bottom known as "porpoiseing." The Mk 13 did sometimes run too deep and it was found that it had a better chance of detonating if striking the target at an angle than at zero degrees. Both the Mk 8 and 13 had this problem and many targets were missed or the fish failed to detonate, an extremely frustrating experience for crews. Due to the temporary withdrawal of Mk 13s after their poor aerial performance at Midway in 1942, plenty were available for the PTs. Both the Mk 8 and Mk 13 were gyro-stabilized and powered by an alcohol-fueled fresh water wet-heater using a two-stage impulse-type turbine.

The Mk 14 designed for submarines was to have been provided to PTs, but required modification of the launch tube. Fortunately this was not necessary as many difficulties were experienced with the Mk 14, including running deeper than set to pass under targets and a faulty exploder.

Elco provided the Mk 18 Mod 1 tubes, but subcontracted their production. This resulted in late deliveries so that completed boats were being turned over to the Navy for shakedown and then returned later to install tubes. A similar tube for the 22.5-in. Mk 13 was developed, but in the meantime a rollover launcher was developed. Only 20-plus boats were fitted with the bigger tubes. Efforts to develop a lighter and more compact launching rack began in 1942. It was not until early 1943 that a PT boat skipper sketched plans for a rollover rack. After testing to dispel BuShip's belief that to prevent the gyro from tumbling it had to be launched from a tube, the system was approved that summer and four rollover racks became standard. The racks could launch both 21-in. and 22.5-in. torps regardless of their length. The Mk 1 Mod 1 rack weighed only 540lb as opposed to the

21-in. Mk 1 Mod 1 torpedo tubes had to be hand-cranked outboard before launching. The "fish" were launched at an angle from the boat's course, but the gyros were individually set to turn them on to the correct course with a one-degree spread between each of the four torps.

"FISH" AND "ASHCANS"

Mk 8 Mod 3 torpedo

Diameter: 21in.
Length: 246.3in. (20ft 6in)
Weight: 2,600lb
Warhead: 466lb TNT
Speed: 36knots
Range: 16,000yds

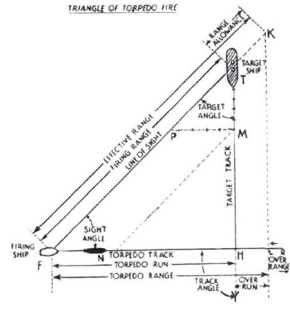
Mk 13 torpedo

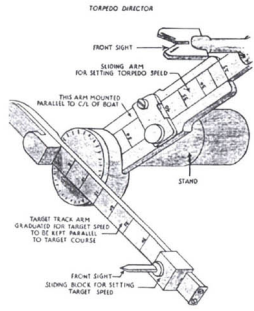
Diameter: 22.5in.
Length: 161in. (13ft 5in)
Weight: 2,216lb
Warhead: 600lb TPX*
Speed: 33.5knots
Range: 6,300yds

Mk 6 depth charge

Diameter: 18in.
Length: 28in.
Weight: 345lb
Charge: 300lb TNT
Sink rate: 8–12ft per sec
Depth range: 30–300ft (mid-1942: 30–600ft)

* Torpex was 50% more powerful than TNT and composed of 42% RDX, 40% TNT, and 18% powdered aluminum.




TORPEDO DIRECTOR
FRONT SIGHT
SLIDING ARM FOR SETTING TORPEDO SPEED
THIS ARM MOUNTED PARALLEL TO C/L OF BOAT
STAND
TARGET TRACK ARM GRADUATED FOR TARGET SPEED TO BE KEPT PARALLEL TO TARGET COURSE
FRONT SIGHT—SLIDING BLOCK FOR SETTING TARGET SPEED

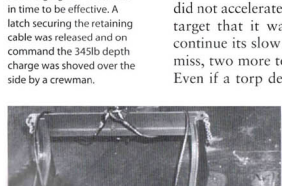
ABOVE
The triangular principal of torpedo fire.

ABOVE RIGHT
The torpedo director, mounted in the cockpit, explained.

Mk 18 tube's 1,450lb. The racks also freed more deck space for guns and eliminated the "hot run" hazard. Torpedoes were launched from the racks by a torpedo-man operating a lever beside the rack. Using Mk 13 torps with racks instead of Mk 8s with tubes reduced a boat's payload by over 5,000lb, although tubes were still fitted to boats destined for the Aleutians and lent to the Soviets for protection from Arctic conditions.

The classical image of a PT-delivered torpedo attack is of a boat roaring out of the darkness at top speed and rapidly launching its fish while blazing away with all guns. There were instances where such attacks were conducted, but reality more often required a less ostentatious approach. Once a target was detected, a slowly cruising boat would quietly maneuver itself into a favorable position, a difficult undertaking since the boat generally had to attack perpendicular to the target's path, which may have been making course changes and varying its speed. Once in position the PT would close the range at around 8knots, until the optimum range was reached. If the PT boat was too close torps would not arm before reaching the target; if it was too far away, the lead estimate could be in error. Usually two fish were launched and it was hoped the firing flash would not be detected. The boat did not accelerate and speed out of the area, since this would have alerted the target that it was under attack and draw fire. Instead the boat would continue its slow approach, observing and counting off seconds. If it was a miss, two more torps would be launched and the boat would remain quiet. Even if a torp detonated the boat would turn away at low speed to avoid attracting fire, but if the target burned the boat would be illuminated and would be forced to speed away.

A Type C individual depth charge rack for the Mk 6 "ash can," a rare example of simplicity. A depth charge was stowed in the rack, which was preset for a relatively shallow depth as the PT boats had to be extremely close to the submerging sub to reach it in time to be effective. A latch securing the retaining cable was released and on command the 345lb depth charge was shoved over the side by a crewman.



From the beginning of 1942 an alternative arrangement was approved. The two stern torps could be replaced by depth charge racks; either four Type C individual release racks on each side or two stern racks each holding four Mk 6 "ash cans" (mounted only on two boats). Sometimes one Type C rack was fitted on either side between the Mk 13 torps or on either side of the forecastle. In 1941 an attempt was made

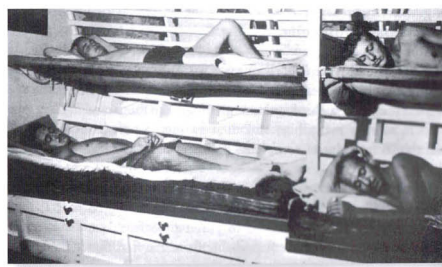
to adapt 12 PTs to sub-chasers (PTC). The high-speed engines drowned out sonar and the project was abandoned.

Originally the arms locker was provided with a Thompson .45-cal. M1928A1 submachine gun, two Springfield .30-cal. M1903 rifles, and a Colt .45-cal. M1911A1 pistol for each crewman. Later one or two .30-cal. M1 carbines and Winchester 12-gauge M12 or M97 pump shotguns were added, plus whatever weapons enterprising crewmen scrounged, including hand grenades. The small arms were for boarding and landing parties, repelling boarders, guarding prisoners pulled from the drink, and defending PT boat bases.

One last item was a pressurized bottle mounted astern containing 32gal of titanium tetrachloride, the Mk 3 smoke generator. When the valve was manually opened it created dense white smoke when the chemical came in contact with air. This could screen a boat's withdrawal; create a screen to hide the maneuvering of other boats and landing craft, or blind enemy gunners ashore and could hamper attacking aircraft. It could spew smoke for half an hour.

Propulsion

Besides firepower PT boats were built for speed. Three Packard 1,200 brake horsepower (bhp) 4-M2500 marine petrol engines were fitted with Holley aircraft carburetors. This same engine was used in all boats regardless of manufacturer. It has been rumored that it was a licensed copy of the British Rolls Royce-Marlin, but it is based on the Packard 1925 Liberty aircraft engine. This was a V12, four-stroke, saltwater-cooled, supercharged engine weighing 3,000lb. Engines developed 1,200bhp in 1940. Improvements raised it to 1,350bhp in 1943 and then 1,500bhp in 1945; these were necessary because of armament weight increases. The typical cruising engine speed was 2,400rpm. At their top speed of 41knots the engines reached 3,000rpm, but this could only be maintained for a short time. They used 100-octane aviation gasoline, which they could mooch off of seaplane tenders or cruisers (which had catapult aircraft). On the stern transom of Elco boats were six exhaust vents and mufflers. The exhaust could be directed through the mufflers with their outlets either underwater or bypassed to increase power. On Higgins boats there were three below-waterline exhaust vents and mufflers, one per side from each engine. The helmsman had throttles to control speed, but an annunciator on each signaled the engine room when the engine went from neutral (idle) to ahead so that they would know when to manually change gears. A speaking tube also connected the cockpit and engine room. One engine was forward of the other two on the centerline. Each had its own clockwise-rotating 28-in. three-bladed prop and rudder. The boat could run on any one engine in event the others were damaged or



The crew's sleeping quarters in a Higgins boat. Quarters were hot and muggy. Boats usually carried folding canvas cots so men could sleep topside.

PT BOAT LOSSES

Of the 531 PT boats in US service a total of 69 were lost to enemy action, friendly fire, storms, and accidents. Another 12 boats were stricken from the list as worn out (surveyed) or obsolete.

Reason for loss	No. of boats lost
Enemy surface ship gunfire	5
Rammed by enemy ship	2
Enemy bomb attack	4
Kamikaze strike	2
Enemy aircraft strafing	1
Enemy mines	4
Enemy shore guns	5
Damaged by enemy ship, grounded, & destroyed to prevent capture	1
Lost in transit aboard torpedoed tanker	2
Grounded & destroyed by own forces to prevent capture	18
Destroyed to prevent capture[1]	3
Grounded or destroyed by storm	5
Collision	3
Explosion or fire in port	6
US aircraft attack	3
Australian aircraft attack	2
US ship attack	2
Undetermined[2]	1

[1] Engine failure and adrift.

[2] Either enemy shore gun or US ship wild shot.

broke down. When running slow and quiet at night the center engine would be used. Its prop was deeper beneath the water and created less wake. At night the phosphorescent wake was easily detectable by aircraft and ships' lookouts stationed in the tops. In daylight distant aircraft might detect the wake before the boat was seen.

Some boats achieved up to 45knots (approximately 40mph), with light armament. The average top speed was 39–40knots. There were many factors affecting a boat's performance. Fresh water in a river or at the mouth of a river gave a knot or two of additional speed. Warm seawater, especially in the tropics and the summer Mediterranean, hampered the engine cooling system, which pumped seawater through. Marine growth on the hull, again especially troublesome in the tropics, created drag. Wave and swell height too slowed a boat. The choppier the surface, even if the swells were not so high, the more the speed would be hindered. Running head-on into high swells could damage the hull, jar gun mounts, work electrical systems and other gear loose, and injure crewmen.

Operating range varied greatly depending on speeds, surface conditions, currents, and winds. At 35knots (approximately 30mph) the range might be 360 miles. At 9knots a boat could cover 600 miles. If the boat ran continuously at full throttle the fuel would be exhausted in six hours. Of course, during a patrol the boat would run at varied speeds, first using a moderate speed to reach its operating area, then crawling along on one engine, thereby minimizing noise and wake. If the boat engaged the enemy there would be brief periods of high-speed maneuvering, followed by more crawling through the water, and then a return to base at cruising speed.

THE PT BOAT IN ACTION

PT boats were expected to be used not only to attack capital ships and other large combatants, but also to charge into formations of ships and face a barrage of cannon and automatic weapons fire from multiple directions. The Navy anticipated inevitable high losses from these sorts of actions. The wooden boats, devoid of armor and filled with high-octane gasoline and ammunition, including torpedoes, were expected to be highly vulnerable, but they were viewed as low cost, expendable warships. The loss of an 80ft boat and its 12-man crew in exchange for a capital ship was well worth the

E

HIGGINS 78FT PT BOAT

This 78ft Higgins boat (**1** and **2**) of the PT 791–808-class is more heavily armed than earlier Higgins boats. On the forecastle is a 37mm M4 automatic gun, two eight-tube 5-in. Mk 50 rocket launchers on either side of the charthouse, two twin .50-cal. turrets flank the cockpit, a pair of twin .50-cals have been retrofitted amidships, a 20mm Mk 4 cannon is on the fantail, and on the stern is a 40mm M1 gun. While the boat has retained its four Mk 1 roll-off torpedo racks, only two Mk 13 torps are carried forward. It has been fitted with the newer SJ radar. The "zebra pattern" was based on the "Adaptor System," itself reminiscent of World War I "dazzle camouflage," which saw limited use through World War II. The concept relied on the distorting pattern to make range estimation and the craft's heading difficult to determine rather than conceal it. It has been long debated whether it achieved this objective. Two squadrons were painted in the zebra camouflage, MTBRON 10 (Elco 80ft PT 103–196-class shown here – **3**) in the South Pacific and MTBRON 15 (Higgins 78ft PT 197–254-class) in the Mediterranean. At night in the moonlight the white stripes were conspicuous and MTBRON 10 quickly repainted its boats dark green. It is reported that some boats in the Mediterranean used dull yellow rather than white. The scheme was difficult and time-consuming to paint and maintain. The insert insignia is the 1944 officially approved shoulder patch for enlisted men. The Navy was uncomfortable with sleeve patches and abolished all in 1947.

E HIGGINS 78FT PT BOAT

The crew of PT 305, a 78ft Higgins in the PT 265–313-class, chow down amidships on a folding table brought up from below. Note the retrofitted .50-cal. machine gun on a pipe-stem mount.

PT crews had to learn a new vocabulary, means of orientation, and skills aboard the mosquito boats. (US Navy)

cost. It was great deal less than a destroyer and a few hundred men with the same torpedo attack capability. In fact, only 13% of the boats were lost, of which about a third were lost to friendly fire, storms, and accidents. A real threat was friendly aircraft, which accounted for almost as many boats lost as did Japanese planes. Allowed to defend themselves if attacked by Allied aircraft, PT boats shot down at least three US aircraft. In all, 808 PT boats were contracted for. Of these, 136 were not completed and their contracts were canceled with the war's end; 181 were transferred to the USSR; 65 to the Royal Navy; 20 were reclassified to motor gun boats (MGB) and sub-chasers (PTC).

THE CREWS

The early boats, which were armed with only two pairs of .50-cals. and a 20mm gun, might have had only a 10-man crew including two officers. As armament increased the crew grew up to 15, of whom three were officers. Typically crews were 12–14 officers and men with a maximum age of 35, but most were aged between 18 and 20. For a full crew of 15 the skipper was a lieutenant or lieutenant (junior grade), the XO and gunnery officer were ensigns. The enlisted men included: three gunner's mates (GM), three motor machinist mates (MoMM), one torpedo-man (TM), one radioman (RM), one radarman (RD), one quartermaster (QM), one cook (Ck), and one deck seaman (S). Actual ratings varied, as did pay grades; there might be two TMs and one less GM for example, or three motor mates. Seldom was an actual cook assigned. Instead there might be an additional MoMM, gunner, or seaman. Someone would take the cook's duties, having volunteered or demonstrated the ability, to be assisted by others. Whether the man was a trained cook or not, it was beneficial to keep him happy.

(WHOO-OOF!) I MET A CARRIER PIGEON, AND HE SAID IT'S JUST AS BAD IN TH' PACIFIC!
LEMME OUT OF HERE
HE'LL NEVER MAKE A PT SKIPPER-- HE WON'T TAKE TH' WIRE OUTTA HIS CAP...!
AND HE HAD HIS WHITE SCARF CLEANED - NOT SALTY AT ALL!
ONCE WHEN WE WUZ IN THE ALEUTIANS...
IN TH' MEDITERRANEAN WE HAD TWICE AS M...
DO YOU WANT WE SHOULD WAVE GENERAL QUARTERS NOW, SIR?
LISTEN, THEM NEW GUINEA NATIVES WOULD...
MAYBE I CAN JUMP CLEAR FROM HERE!
IT'S ABOUT TIME FOR AN "ENSIGN OVERBOARD" DRILL, AIN'T IT?
YOU'RE ABSOLUTELY ON YOUR OWN!!
NOW, REMEMBER...
TH' BOSS SAID-- "NO SWIMMING!"
BRING 'EM OVER EASY!
HARD RIGHT!
SPEED UP!
OBJECT SIGHTED!
BEARING: 134 - 134 ??
SO I HAVE TO HEAR ABOUT HIS SONS BE WHEN YOU GROW UP, LIEUTENANT
HARD LEFT!!
JUST TAKE A MINUTE
BOSN AND TH' ARMY INVITED ME TO JOIN THEM UP!
I'M LIKE BE! I ALWS ADVF GOT MY ORDERS!
LOBSTER POT! - BEARING ZERO THREE ZERO!!

PT boats were sometimes equipped with more weapons than could be fully manned, so all the men, including officers, were trained as gunners by the GMs and the QM trained them as lookouts. The weapons could then be employed as the target required. Every

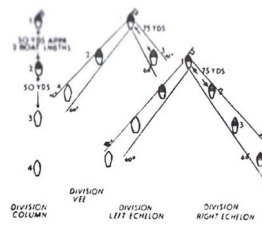
Elco boats enduring the bombing of a convoy off Leyte. They served to defend against low-flying attack aircraft, rescue seamen abandoning ships, and occasionally to recover downed Japanese airmen.

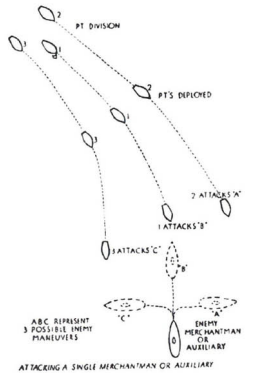
man learned his shipmates' duties, at least to the extent where he could pull radio or radar watch, start up and run the engines, and charge up a torpedo. He might not be able to repair the radio or repair busted exhaust hoses, but he knew how to make the boat run. Rating titles are self explanatory, except for that of the QM, who was responsible for navigation, maintaining charts and logs, and was also trained as a radio operator. With crews larger than planned, "hot-sheeting" or "hot-bunking," watches sharing bunks, was common.

Few crewmen assigned to the boats had ever been on the water. The Naval Reserve officers (few Annapolis graduates were assigned to small craft) were trained in basic seamanship and leadership skills as part of their officer training. After basic seaman training, enlisted crew underwent two to three months' specialty training at various Navy schools throughout the country. They acquired basic skills common to their specialty and not PT boat-specific skills.

A temporary MTB school was established at Naval Torpedo Station, Newport, Rhode Island (RI) in early 1941, but was disestablished in August of that year. In February 1942 the Navy Department directed that the MTB Squadrons Training Center, supported by MTBRON 4, be established at Melville, RI and this became operational in March. Officers and enlisted men were assigned to the school for two months' crew training, learning their specific duties and those of other crewmen. The training period was extended to three months in 1943 so that men could receive more training in their own specialty. Refresher training for redeploying crews was implemented in 1944 and later that year a commander's course was instituted for nominated squadron commanders. Melville was an ideal location, other than the foul winter weather that sometimes hampered training. It was close to the Naval Antiaircraft

PT 191 replenishes fuel from a seaplane tender while underway. Seaplane tenders frequently serviced PT boats as they had aboard a significant aviation gasoline fuel store. Other boats are lined up awaiting their turn. This boat is armed with a 37mm M4 gun, a 20mm Mk 4 on the port beam, a twin .50-cal on the starboard beam, two Mk 13 torps, and a 40mm M1 gun on the fantail.





The upper illustration depicts four four-boat division formations. The lower demonstrates a three-boat division attack pattern and what boat would take what action depending on the target's response.

Training Center, Naval Torpedo Station, and a naval training station rifle range, plus use was made of the Packard Engine School in Detroit and the Elco plant in New Jersey. Besides crew training the Training Center, known as "Specht Tech" after its first commander William C. Specht, undertook testing and equipment development. Once boats had seen action, combat experienced crewmen rotating Stateside became instructors.

Boat crews would be formed and squadrons commissioned. By the war's end almost 1,800 officers and 11,700 enlisted men assigned to MTB squadrons, tenders, and bases were trained at Melville. When squadrons were commissioned they underwent a period of unit training in tactics and took their new boats on shakedown cruises. The shakedown cruise tested all boat systems, verified its individual speed and maneuverability, ensured construction viability, and provided the crew with the opportunity to learn the boat's systems and their jobs. Elco squadrons would form at Melville and conducted shakedown there. They would then be shipped to Panama for more training en route to the Pacific. Higgins squadrons formed in New Orleans and cruised to Submarine Chaser Training Center, Miami, Florida, where they undertook shakedown. These cruises initially lasted for two weeks, but were then extended to three weeks, which became the MTB standard. Owing to the poor weather at Melville, from the end of 1943 all shakedowns were conducted at Miami. The transit from Melville to Miami and across the Gulf of Mexico from New Orleans afforded new crews valuable experience.

To support a PT squadron aiding in the defense of the Panama Canal, the US Naval Station, Taboga was commissioned on the little island on the Pacific side in August 1942. All squadrons en route to the Pacific stopped there to conduct tactical training in an area similar to that in which they would soon be operating. Under the command of MTB Squadrons, Panama Sea Frontier, they conducted barge hunting and torpedo attack exercises, weapons firing, navigation cruises, underway refueling, and practiced squadron and division maneuvering at night. A common complaint from the crews was that torpedo training was limited and unrealistic at Melville.

To expedite the commissioning of squadrons, two MTB commissioning details were formed in Navy Yard, Brooklyn New York and Navy Yard, New Orleans in the summer of 1942, where the boats were fitted out and the squadrons were formally commissioned. The Navy yards pre-ordered supplies and equipment needed by squadrons scheduled for commissioning so it would arrive by commissioning time. Late arriving materials would be forwarded to the deploying squadron. For overseas shipment boats were usually carried as deck cargo on tankers and oilers heading in the right direction.

MTB SQUADRONS

MTBRON	Service Dates	Area of Operations
1	Jul 24, 1940–Feb 9, 1945	CenPac, Aleutians
2 (first)	Nov 8, 1940–Nov 11, 1943	SoPac, NG
2 (second)	Mar 23,1944–Sep 21, 1945	OSS in Channel
3 (first)	Aug 12, 1941–Apr 15, 1942	PI
3 (second)	Jul 27, 1942–Aug 7, 1944	SoPac, CenPac
4	Jan 13, 1942–Apr 15, 1946	*Training RON at Melville, RI*
5	Jun 16, 1942–Feb 15 1945	Panama, SoPac
6	Aug 4, 1942–May 29, 1944	SoPac, NG
7	Sep 4, 1942–Feb 15, 1945	NG, PI
8	Oct 10, 1942–Oct 28, 1945	NG, PI
9	Nov 10, 1942–Nov 24, 1945	SoPac, NG, PI
10	Dec 9, 1942–Nov 11, 1945	SoPac, NG, NEI
11	Jan 20, 1943–Nov 11, 1945	SoPac, NG, CenPac
12	Feb 18, 1943–Oct 26, 1945	NG, PI
13	Sep 18, 1942–Nov 23, 1945	Aleutians, NG
14	Feb 17, 1943–Sep 16, 1944	Panama
15	Jan 20, 1943–Oct 17, 1944	Med
16	Feb 26, 1943–Nov 26, 1945	Aleutians, NG, NEI, PI
17	Mar 29, 1943–Nov 19, 1945	CenPac, PI
18	Mar 27, 1943–Nov 1, 1945	NEI, NG
19	Apr 22, 1943–May 15, 1944	SoPac
20	Jun 3, 1943–Nov 24, 1945	SoPac, NG, PI
21	Apr 8, 1943–Nov 10, 1945	NG, PI
22	Nov 10, 1943–Nov 15, 1945	Med
23	Jun 28, 1943–Nov 26, 1945	SoPac, NG, PI
24	May 10, 1943–Nov 6, 1945	NG, PI
25	Jun 17, 1943–Nov 9, 1945	NG, PI
26	Mar 3, 1943–Dec 3, 1945	Hawaii
27	Jul 23, 1943–Oct 19, 1945	SoPac, PI, NEI
28	Aug 30, 1943–Oct 21, 1945	SoPac, NG, PI
29	Oct 22, 1943–Nov 23, 1944	Med
30	Feb 15, 1944–Nov 15 1945	Channel
31	Apr 5, 1944–Dec 17, 1945	SoPac, CenPac, PI
32	Jun 10, 1944–Dec 18, 1945	SoPac, CenPac
33	Dec 2, 1943–Oct 24, 1945	NG, PI
34	Dec 31, 1943–Mar 9, 1945	Channel
35	Feb 15, 1944–Apr 10, 1945	Channel
36	Apr 3, 1944–Oct 29, 1945	NG, PI
37	Jun 5, 1944–Dec 7, 1945	SoPac, CenPac
38	Dec 20, 1944–Oct 24, 1945	PI
39	Mar 6, 1945–Dec 24, 1945	PI
40	Apr 26, 1945–Dec 21, 1945	PI
41	Jun 21, 1945–Feb 6, 1946	Never deployed
42	Sep 17, 1945–Feb 8, 1946	Commissioned after V-J Day
43	Dec 12, 1944–Mar 16, 1945	Never deployed
44 and 45	*Planned, but never commissioned*	
PTCRON 1	Feb 20, 1941–Jul 17, 1941	Sub-chaser test unit, boats transferred to U.K. as gunboats

CenPac = Central Pacific, SoPac = South Pacific, NG = New Guinea, NEI = Netherlands East Indies,
PI = Philippine Islands, Aleutians = Aleutian Islands, Channel = English Channel, Med = Mediterranean

The advanced MTB bases offered only crude facilities and limited support. Local inhabitants were hired to help with the heavy work such as moving 55gal fuel drums from stowage dumps to dockside.

UNITS AND BASES

An MTBRON normally consisted of 12 boats, although this number could be reduced to eight or just six when less capability was necessary. Deployed squadrons sometimes had up to 15 boats, with the extras serving as spares or augmentation. There was no squadron headquarters or staff. The commander was also a boat and division commander, formally a lieutenant commander, but more often a lieutenant and infrequently a commander. The squadron XO was also a boat and division commander. Other squadron officers were assigned additional administrative duties, but most support was provided by the PT boat base. A squadron was equipped with boats of the same make and version to ease maintenance, replacement parts requisition, and exchanging crewmen. There were a very few early squadrons that did receive a mix of boats. For the most part a squadron's boats were numbered in sequence since they were purchased in squadron-size batches, but of course this was disrupted when lost boats were replaced. Squadrons were theoretically organized into three divisions of four boats, but in practice each might have three to five boats. The divisions were numbered in sequence through the squadrons, e.g., MTBRON 1 had Divisions 1–3 while RON 6 had Divisions 16–18 and so on.[3] The senior skipper in each division was the division commander.

Command

Local tactical command of squadrons rested on the naval base commander who assigned them missions. This was a less than efficient arrangement as boat operations were not fully integrated into the overall scheme of operations and coordination with local air units was weak, resulting in frequent Allied air attacks on the boats. In December 1942 MTB Flotilla One was established at Sesapi on Tulagi Island across the Slot from Guadalcanal. To control multiple squadrons operating in the same area, ad hoc commands were formed, known as MTB Squadrons, Bougainville, for example. To oversee the administrative and logistical needs of squadrons the role of

3 To determine a squadron's division numbers multiply the squadron number by three. This is the third division, then subtract 2 to determine the first division

Scores of MTB bases were established as the Allies fought their way across the Pacific, such as this one on Mindoro in the Philippines.

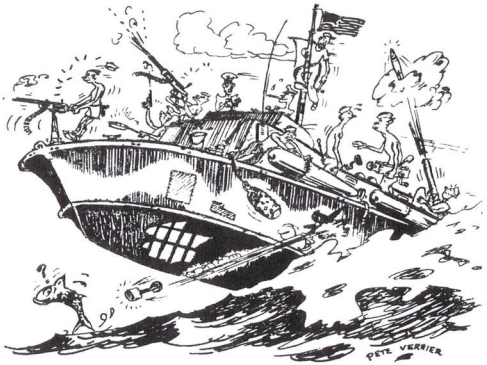
Commander, Motor Torpedo Boats, Pacific (Administrative) was established in January 1943. The commander was double-billeted as Chief of Staff, Commander, Naval Bases, South Pacific and was able to ensure planning and location considerations were given to establishing MTB bases as well as providing parts and supplies. Prior to this boats were breaking down at a disturbing rate, parts were being siphoned off by other units, and some supplies were simply sitting undelivered. MTB Bases 1–3 eventually arrived and set up on Tulagi and Espíritu Santo. In July 1943 the command was redesignated Commander, MTB Squadrons, South Pacific Force. Logistics support was further improved, tactical operations were standardized, and training programs were implemented. Coordination and operations were better planned, with tactical control of the squadrons under Commander, Amphibious Force, South Pacific. Commander, MTB Squadrons, Pacific Fleet was established in December 1944, a third hat for Commander, MTB Squadrons, South Pacific Force. These commands were under the Third Fleet. In June 1944 the command was shifted to Commander, MTBRONs Seventh Fleet for Southwest Pacific operations.

A PT crewman passes down stacked pots with pre-cooked meals and a coffee pot from an MTB tender. Tenders served as mother ships, providing the boats with repairs, spare parts, rations, water, medical attention, laundry and bath facilities, and berthing accommodations.

Support

To support MTBRONs, 19 motor torpedo boat tenders (AGP) were commissioned. The first three were converted from gunboats (AGP 1–3). These less than 300ft craft were themselves converted from luxury yachts built in the 1920s, first to gunboats (PG) and then to AGPs at the end of 1942. AGPs were supposed to provide fuel, ammunition, stores, messing, medical treatment, berthing, and repairs. They lacked the storage and work space for these functions and were found inadequate. The only AGP lost was the USS *Niagara* (AGP 1), which was struck by Japanese bombers in the Solomons and sank. The accompanying PT boats rescued the entire crew. Ironically, a PT boat sank its burning mother ship with a torpedo.

PT crews tended not to take themselves too seriously. This cartoon is from the Navy's *General Quarters!* magazine



To provide the necessary facilities and support it was decided to convert ten landing ships, tank (LST) to Portunus-class tenders (AGP 4–5, 10, 11, 14–18, 20; AGP 19 was canceled) in 1943–45. They were christened with the names of mythological characters.[4] The LST's deckhouse was extended forward for workshops. An athwartship 50-ton A-frame derrick was fitted on the port side (one on each side on later ships), two 25-ton cranes forward and space provided atop the deckhouse for two damaged boats. Armament was two quad 40mm guns and eight twin 20mms. The spacious upper deck and cavernous internal tank deck was compartmented into foundry, machine, electrical, metalworking, carpentry, and torpedo maintenance workshops plus fuel, ammunition, and water storage (water-distiller installed), and accommodations, messing, and laundry for boat crews. The crew of these 328ft ships numbered 340. One AGP normally supported one or two MTBRONs, and was essentially a mobile MTB base. To supplement the AGPs four Barnegat-class seaplane tenders, small (AVP) were converted (AGP 6–9) along with two larger C-1 merchant ships (AGP 12, 13).

4 See Gordon Rottman New Vanguard 115, *Landing Ship, Tank (LST) 1942–2002*, Oxford: Osprey Publishing (2005)

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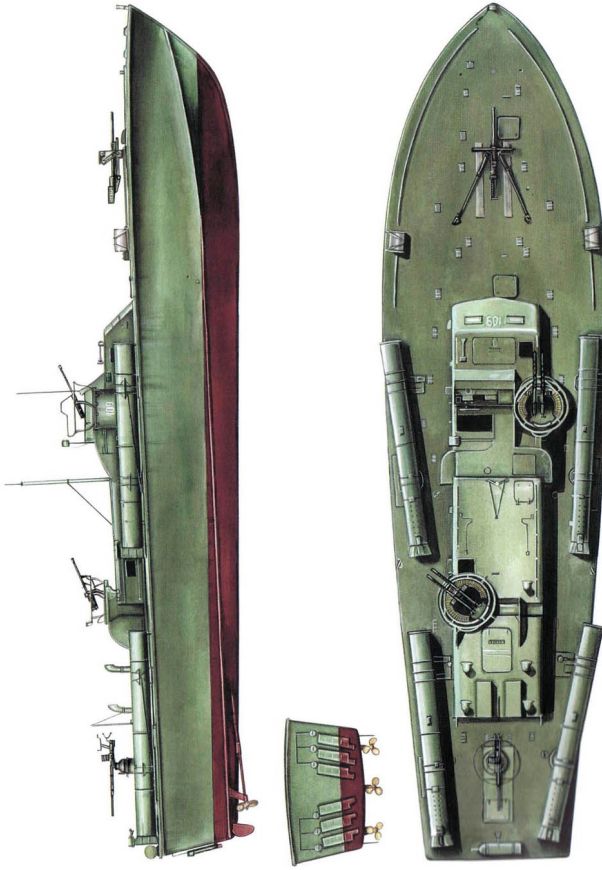
PT 109, ELCO 80FT, 1943

Lieutenant (jg) Jack Kennedy's PT 109 was an 80ft Elco in the PT 103–196-class. It was this class that set the standard for later 80ft Elcos. The 109 boat bore a solid navy green paint scheme, its exact shade unknown, with its hull number on the sides, forward bulkhead of the charthouse, and the back of the 20mm pedestal in small white numbers, as was common practice. Armament was standard with two twin .50-cal. turrets and a 20mm Mk 4 cannon plus two Type C depth charge racks forward, an unusual configuration. The crew had taken the initiative to mount a scrounged Army 37mm M3A1 antitank gun on the forecastle and lashing it to two 2x8-in. planks. These planks saved the crew when the boat was cut in two by the destroyer *Amagiri* on August 2, 1942. The stern transom displays the six big mufflers (two per engine) with the above-water vents for normal cruising and the quieter, but power-draining, below-water vents plus the rudders and clockwise-rotating 28-in. props.

F PT 109, ELCO 80FT, 1943



PT 109 leads a division of 80ft Elcos out to sea for tactical training, possibly off of Panama

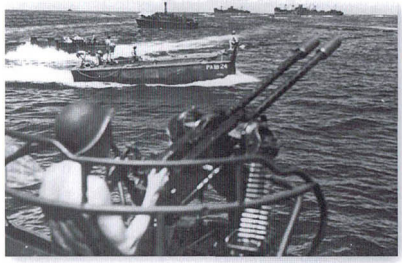
MTB bases were mobile units with an organization that could be tailored as necessary. They were self-contained with all necessary vehicles, equipment, supplies, and expendable materials to operate for 90 days. Ideally, with all components, a PT boat operating base for one squadron had 11 officers and 242 men. But in reality they were usually smaller. At a minimum there was a component known as the E-21 unit–PT squadron portable base equipment. Its nine men and their lightweight equipment sets could be loaded aboard the squadron's boats and deployed to set up a temporary forward base, but a source for fuel, ammunition, and supplies was necessary, usually in the form of another naval installation. Dozens of PT bases were established through the Pacific, relocating forward as the Allies drove toward Japan.

Life on board

The boat crews lived a life much different to men in the "big" Navy. Ashore they lived under usually difficult conditions, especially in the Pacific. The tent camps or huts built in the native style were hot, humid, and wet from tropical rains. Malaria and other tropical diseases were constant hazards. Boats were provided a canvas awning to pitch over the forecastle, which also helped to prevent the crew quarters from getting so hot. The men swam, bathed, and washed clothes off the stern. Facilities to work on the boats were crude and tools and parts were difficult to come by, especially since hard operational usage beat up the boats badly. Begging, borrowing, and stealing from other small craft units became a way of life. Battle-damaged boats were usually written off or destroyed to prevent capture, but whenever possible they were stripped of armament, propulsion gear, and parts. The men became proficient in baling wire and electrical tape repairs. They conducted tiring, long, boring, or terrifying all-night patrols and spent the days repairing and maintaining their boats and weapons with little in the way of diversion. They hunted, but were hunted themselves by Japanese aircraft, patrol boats, and destroyers. Regardless of rank, they became tight-knit teams. They soon developed a reputation for being scroungers and outright thieves as well as being clannish and independent. The brass considered them an undisciplined "Hooligan Navy." They were much on their own and developed a pragmatic outlook.

Some PTs go seventy-five
And some go sixty-nine
If we get ours to run at all
We think we're doing fine

On a more serious note, the PT boaters' unofficial motto repeated John Paul Jones' paraphrased words, "Give me a fast ship for I intend to go in harm's way." Another was the motto coined by the "Wild Man of the Philippines," John Bulkeley commanding MTBRON 3, which spirited MacArthur off the besieged island of Corrigedor: "Hit 'em hard."



Here a PT boat escorts LCVP landing craft to shore providing antiaircraft protection. Most .50-cals dispensed with flash suppressors, but these guns had tube-type suppressors. Others had cone-shaped flash-hiders.

DEPLOYMENT

PT boats were deployed to several diverse regions with very different climatic and tactical environments, which required different weapons, tactics, and other considerations. The South Pacific operations were conducted mainly in the Solomon Islands. The Southwest Pacific included New Guinea and areas south in the Netherlands East Indies, mainly Borneo. The Philippines is included in this area and it was here that the PT squadrons from the South and Southwest Pacific areas joined forces. Including the three squadrons assigned to the Aleutian Islands off Alaska, 32 squadrons operated in the Pacific Theater. Many units from the South Pacific also operated in the Central Pacific, namely the Ellice, Gilbert, and Marshall Islands, and Okinawa. Four squadrons operated in the English Channel (one supporting the Office of Strategic Services) and three in the Mediterranean. Another six squadrons never deployed or remained in rear areas conducting training and security missions.

Initial engagements

When the Japanese struck Pearl Harbor and the Philippines, a squadron was based in each area. At the time there were just 29 PT boats in the Navy. MTBRON 3 was in New York prepared to be shipped to Panama. The crews of MTBRON 1 at Pearl Harbor were among the first gunners to respond to the attack, claiming two of the first planes downed. However, so many ships were firing on attackers that it was impossible to make other kill or damage claims. The squadron also saw action at the Battle of Midway in May 1942,

An 80ft Elco sets out on a night patrol off of New Guinea. Two .50-cals have been mounted on the forecastle.

PT 174 was an 80ft Higgins in the PT 103–196-class. It mounts a 37mm gun forward, unusual in that it has a shield. Gun shields were often removed to save weight as they offered little actual protection.

where it shot down three aircraft. It was later split between the Ellice Islands and the Aleutians. MTBRON 13 and 16 were deployed to the Aleutians in March and August 1943, respectfully, withdrawn in May 1944 for Stateside overhaul, and then redeployed to the Southwest Pacific. Bases were established at Adak and Attu once it was recaptured. In Alaskan waters the boats mainly conducted patrols and air guard operations and it was found they were ill-suited for the brutal weather conditions.

In Manila Bay MTBRON 3 possessed only six boats; six more were to have been transferred from MTBRON 1 at Pearl Harbor. The maneuvering boats were attacked in the bay and proved the theory that they could make hard turns to evade bombs that had been released at them. That first day they downed three Japanese airplanes. While the boats were unscathed, they lost most of their spare parts, torpedoes, and fuel as Naval Ammunition Depot, Cavite, was bombed. During the following months, the boats conducted patrols and possibly sank some light Japanese shipping, although this was never confirmed. Conditions were atrocious, with little fuel (most was contaminated, reducing speed and causing sudden stoppage), few parts, and no torpedoes. Boats were lost to groundings and simply wore out. Four boats evacuated General MacArthur from Corregidor on March 11, 1942, infiltrating 560 miles through Japanese patrols to Mindanao in the south, from where he was flown to Australia. The squadron's two remaining boats evacuated Philippine president Quezon from Negros to Mindanao on March 19 to be flown out. With the boats out of action, some of the crew made it out by submarine; others joined guerrillas, and many were captured.

Higgins boats of MTBRON 13 tied up to the USS *Gillis* (AVD 12) at Attu Island in the Aleutians along with a PBY Catalina flying boat, summer 1943. The boats carry standard armament: two twin .50-cal. turrets and a 20mm on the fantail, although the center boat has a retrofitted 20mm on the forecastle. Boats in the Aleutians were painted light gray to blend into the persistent fog.

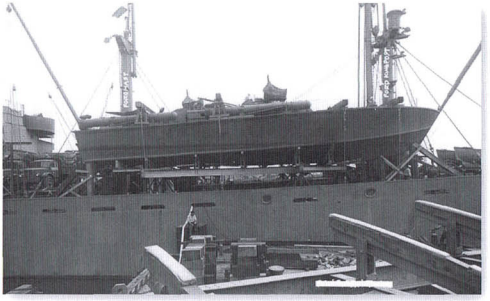
A Norwegian-built Nasty-class PTF used in Vietnam. They typically mounted an 81mm Mk 2 Mod 1 direct-fire mortar with a .50-cal. M2 machine gun piggy-backed on top, two 20mm Mk 4 or Mk 16 cannons, and a 40mm M1 gun amidships. Originally another 40mm was on the forecastle and some were fitted with two 7.62mm M60 machine guns. In spite of the PTF designation, none mounted torpedoes. The camouflage scheme is dark olive drab, black, and light gray. Length: 80ft 6in. Beam: 24ft 6in. Displacement: 75 tons. Speed: 44knots.

South Pacific

The first PT boats to arrive at Guadalcanal on October 12, 1942, more than two months after the Marines landed, were from the new MTBRON 3. Within days, the first boats were engaging Japanese destroyers of the Tokyo Express running down the Slot from Rabaul. This is when it was fully understood how defective the torpedoes were. Without radar the PT boats experienced difficulties locating the marauding destroyers. All too often the PT boats failed to discover the Japanese until ranges were too close to launch torps and the PT boats were outgunned by the destroyers at close range. It was not long before the destroyers were being armed with deadly 13.2mm (.52-cal.) machine guns with floatplanes from the Shortlands flying cover. The enemy destroyers were delivering troops and supplies to the Japanese garrison on Guadalcanal. This included dropping off drums of fuel and rations to float ashore. Radar-equipped PBY flying boats began to scout for the Japanese boats in January 1943 and the score improved. The first significant success was by PT 59 when it sank a supply submarine and two other boats sank a destroyer, although one was lost in the action. The Japanese reported that the enemy PT boats were difficult to detect when they hid along jungled shores and in coves. The PTs soon learned to hide in drifting cloud shadows.

On January 10/11, 1943, nine Japanese destroyers ran down the Slot to supply their battered troops ashore. Forewarned, 13 PT boats intercepted the force, resulting in three damaged destroyers with two PTs lost and one damaged. The destroyers withdrew and were forced to jettison 1,200 fuel and ration drums to drift ashore. Only 220 made it, with the rest machine-gunned by PT boats and aircraft. In the first week of February the Japanese successfully evacuated Guadalcanal.

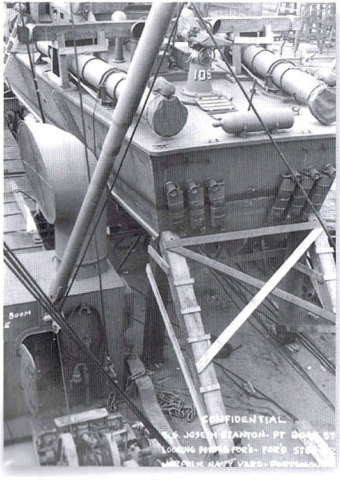
The Allies moved up the ladder of the Solomon Islands to New Georgia, Bougainville, and New Britain. The Japanese had numerous garrisons scattered through the islands and the distances between each were relatively short. PT boat radar and aircraft made it more dangerous to resupply garrisons with



PT 109 stowed aboard a Liberty ship for overseas shipment. The 56-ton boats had to be securely stowed in the event of heavy weather. The boat's antiaircraft guns could be used in the defense of its transport ship.

Another view of PT 109 ready for transhipment. Access ladders were provided so the crew could maintain the boat and practice gun drills. Torpedoes were not carried as they added to the explosive hazard if the ship was attacked.

destroyers. The Japanese employed landing barges to creep from island to island at night and a series of staging bases were established where the enemy would hide out during the day beneath overhanging trees.[5] The increasingly numerous and aggressive "devil boats" forced the Japanese to arm the slow barges with 7.7mm and 13.2mm machine guns, 20mm and 25mm cannons, and 37mm antitank guns. The PTs perfected barge hunting tactics, operating in groups of two or three; in the event that one boat was disabled the others could take off the crew or tow the damaged boat. However, there were failures too. On the night of August 1/2, 1943 five Japanese destroyers off Kolombangara ran through 15 PTs deployed in three groups. Eight boats launched 30 torpedoes, but did not inflict any damage. That was the night when PT 109, commanded by the future President John Kennedy, was rammed by a destroyer.



That was the last destroyer encounter, but Japanese fighters, dive-bombers, and torpedo-bombers from Rabaul were a constant threat, although the boats' maneuverability made them very difficult targets and in fact few were lost to air attack. Another threat was grounding in the poorly charted waters and operating at night. There were few boats that at one time or other did not ground. Few, too, were unscathed by gunfire. Japanese barges proved difficult to knock out and PT boat firepower was increased. Barge traffic could not be halted of course, but it was impeded to such a point that isolated Japanese garrisons

5 The most widely used barge was the 49ft Type A Daihatsu with a bow-ramp. It could carry 70 troops at 8–10knots

suffered from food and ammunition shortages. Their ability to evacuate islands ahead of the Allied advance was also limited.

The closely spaced, large islands of the Solomons were ideal for the PT boats. The boats had less utility in the Central Pacific where islands and atolls were farther apart. The Japanese had pre-stocked their bases and they could not be so easily starved out. PTs still had their uses though. In June 1944 South Pacific squadrons came under Seventh Fleet control and most operations were shifted to the Southwest Pacific.

Southwest Pacific

In December 1942 the first PT boats commenced operations in New Guinea waters. The first crude bases were established on the big island's east end, in Papua. The Japanese were establishing lodgments all along the island's northeast coast. The island of New Britain stretched eastward from New Guinea's Huron Peninsula. On New Britain's distant east end was the region's main Japanese navy base, Rabaul. As in the Solomons, the many Japanese bases were established and supplied by barges running down the New Britain coast and branching out to reach the bases on the New Guinea coast. Barge hunting was the main focus of the PTs and the large numbers of Japanese bases meant there was a great deal of traffic. Larger ships were sunk by aircraft, but seldom seen by PTs.

Parts and supplies were even scarcer than in the Solomons. Radar sets and power generators had to be removed from boats returning from patrol and placed in the next boats to sortie. However, in February 1943 more boats arrived. The Battle of the Bismarck Sea occurred in March and PTs were dispatched to hunt for survivors, but only sank a single cargo ship and some troop boats. As MacArthur's forces leapfrogged up the coast, selected Japanese bases were bypassed and allowed to wither, with hundreds of supply barges destroyed. The PT boats also supported amphibious landings and intercepted Japanese attempts to reinforce garrisons and islands under American assault. PT operations around New Guinea were completed in November 1944 with 14 squadrons serving there, the same number that had served in the South Pacific Area. It was time to return to the Philippines.

In October 1944 five squadrons made their way to Leyte to support the first American landing to retake the islands. The 1,200-mile transit from New Guinea was accompanied by three MTB tenders, demonstrating their long-range deployment capability. Operations were much the same as elsewhere with interception of Japanese boats moving from island to island. Ultimately 20 squadrons were employed in the Philippines.

Europe

Three squadrons served in the Mediterranean and four in the English Channel. In the Mediterranean the PTs frequently operated with British MTBs along the North African, Sicilian, Italian, and French coasts. Operating ranges were great and there was a high threat from German aircraft and E-boats.[6] A major effort was made to attack German F-lighters (armed supply landing craft), coastal shipping, and to counter E-boat operations. The squadrons also conducted intelligence collection runs, recovered pilots, performed deception operations, and landed agents; they claimed to have

6 E-boats (a British designation adopted in 1940 as an abbreviation for "Enemy war motorboat") were German fast torpedo boats, *S-boot* or *Schnellboot*. See Gordon Williamson, New Vanguard 59, *German E-Boats 1939–45*, Oxford: Osprey Publishing (2002)

The starboard side of the charthouse of PT 617, an 80ft Elco PT 565–624-class exhibited at the PT Boat Museum at Battleship Cove, Fall River, Massachusetts. Note the 8-in. spotlight, which also served as a signal blinker light. (Ron McKenna)

sunk 28 vessels for the loss of four boats. To expend the remaining old Mk 8 torpedoes they employed the simple expedient of firing them blind into Italian ports at night, to be gratified with massive explosions.

PT boats did not arrive in the English Channel until March 1944. The first was MTBRON 2, with only three boats specially equipped and their crews trained to deliver Office of Strategic Services agents. Three more squadrons eventually deployed to serve under the British Coastal Forces. Besides patrols intercepting coastal traffic, during the Normandy landing they delivered senior officers ashore, escorted minesweepers, rescued survivors of sunken vessels, and screened against E-boat attacks. Afterwards PTs harassed German minesweepers and other craft, and monitored Channel ports still in German hands. While three PTs were lost in the Channel, no enemy vessels were sunk.

Postwar

Many of the English Channel boats were transferred to the USSR. Others were returned to the States for refurbishing and transfer to the Pacific, but V-J Day saw this proposed move canceled. After their squadrons were

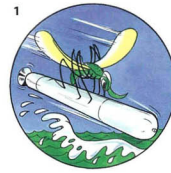
G

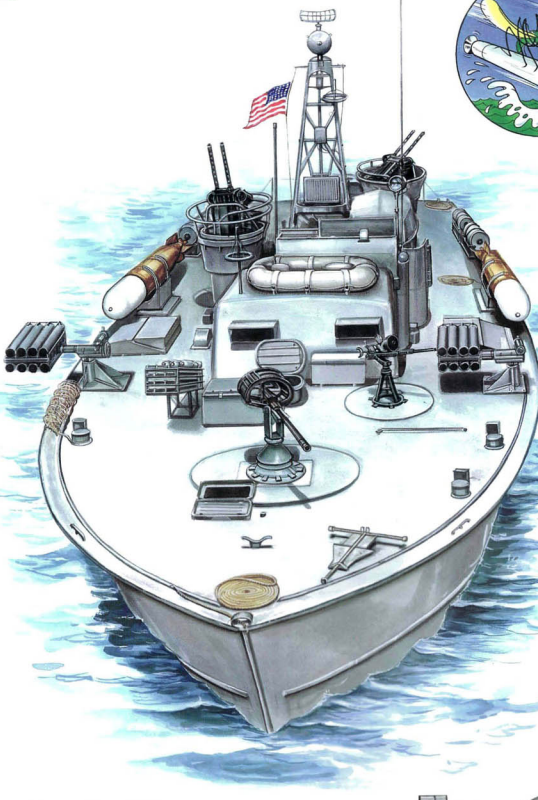
LATE-WAR BARGE-KILLER

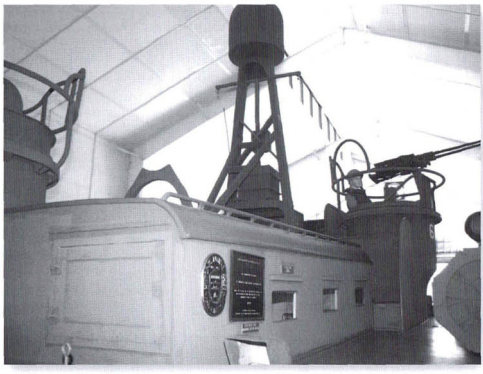
By 1945 PT boats had been maximized for barge-hunting. This 80ft Elco PT 565–622-class mounts a 37mm M4 automatic gun on the bow with two more "horse collar" magazines in the ready locker and a 20mm Mk 4 cannon on a low, lightweight Mk 14 mount on the port forecastle, which was used to range the 5-in. rockets. A 4.5-in. Mk 6 barrage rocket launcher is on the starboard forecastle. On both sides are 5-in. Mk 50 rocket launchers, the starboard swung outboard for firing and the port stowed inboard. The low rectangular compartments aft of the launchers are rocket lockers with one reload. This Peter Tare carries two Mk 13 torps on Mk 1 roll-off racks and four Type C individual depth charge racks with Mk 6 "ash cans" in lieu of the aft torps. On the fantail is a 40mm M1 antiaircraft gun on an M3 mount. The radar is the earlier SO.

Inserts: (**1**) The "Mosquito Fleet" insignia designed by Disney Studios in March 1940 and displayed on unit signs. (**2**) 5-in. rocket used in the Mk 50 launcher. (**3**) 7.2-in. antisubmarine rocket used with the Mk 20 Mousetrap launcher. (**4**) 4.5-in. barrage rocket fired from the Mk 8 launcher.

G LATE-WAR BARGE-KILLER







The starboard side of PT 617's day cabin. Note the aft hatch. There was another hatch on the starboard forward topside of the day cabin. (Ron McKenna)

decommissioned, 121 boats were beached on Samar in the Philippines in late 1945 and burned. The Navy had no use for the battered and worn boats and mothballing wooden boats was out of the question. Small numbers were given to Argentina, Cuba, Finland, the Philippines, South Korea, and Yugoslavia. The remaining boats in the US were broken up. A few were sold to civilians and used as sightseeing boats, diner cruisers, fishing or dive boats, etc. The Navy retained just four boats for testing and in 1950–51 built four new types for further development. One was later used to escort the presidential yacht. From 1962 the US Navy acquired 27 patrol torpedo boats, fast (PTF), slightly larger and more heavily armed than their World War II predecessors. They were mainly used off the Vietnamese coast for special operations and fire support. Most were Norwegian-built Nasty-class boats. Some were turned over to the South Vietnamese and the others retired.

MEMORIALIZED PT BOATS

Five motion pictures have portrayed PT boats: the John Wayne classic, *They Were Expendable* (1945) of MTBRON 3 in the Philippines; *PT 109* (1963), which heralded the future President John Kennedy's exploits; less authentic movies, *McHale's Navy Joins the Air Force* (1965) and two named *McHale's Navy* (1964, 1997, which had nothing to do with World War II), plus the 1962–66 television series, *McHale's Navy*, which portrayed a fictitious PT 73 (the actual boat ran aground and burned soon after arriving in the Pacific).

Today few PT boats remain. PT 617, an 80ft Elco, and PT 796, a 78ft Higgins, are restored and displayed indoors at the PT Boat Museum at Battleship Cove, Fall River, Massachusetts. PT 728 was a 78ft Vosper built for the USSR, but never delivered. It is located in Key West, Florida, giving sightseeing tours. Its restoration is not entirely accurate because it was refurbished to appear similar to an Elco. PT 658 is berthed at the Swan Island Naval Operational Support Center, Portland, Oregon. The Higgins 78ft has

been fully restored by Save the PT Boat, Inc. and is the only operational, accurately restored boat in existence. PT 659, of the same design, is undergoing restoration with the intention that it will eventually be displayed at the Ft. Vancouver National Historical Site in Washington state with hull portions cut away. It is presently at Pearson Field Airport in Portland. PT 309, a Higgins 78ft, is being restored at the Admiral Nimitz Museum of the Pacific War in Fredericksburg, Texas. It is not yet on display. The wreckage of PT 109 was discovered in 2002 in Blackett Strait between Kolombangara and Arundel Islands by Robert Ballard, the discoverer of the *Titanic*. One Vietnam-era Osprey-class PTF remains, PTF 26, the last US PT boat built, at Liberty-Maritime Museum, Sacramento, California.

Several companies provide PT boat plastic or wood scale models and these have long been favorite kits. It is also a popular radio-control model. Model PT boats in a wide range of scales are produced by: Fine Arts Models, Revell-Monogram, Tamiya, Italian, Renwal, Testors EasyBuild, Mosquito Boat Hobbies, White Ensign, and ToyZone.

PT Boats, Inc. (http://www.ptboats.org) is based in Memphis, Tennessee. It maintains the PT Boat Museum at Battleship Cove in Fall River, Massachusetts.

Save the PT Boast, Inc. (http://www.savetheptboatinc.com) is based in Portland, Oregon. Both organizations are actively preserving and display restored PT boats.

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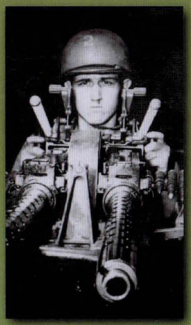

US PATROL TORPEDO BOATS

World War II

Motor torpedo boat development began in the early 1900s, and the vessels first saw service during World War I. However, it was not until the late 1930s that the US Navy commenced the development of the Patrol Torpedo (PT) boat. The PT boat was designed for attacking larger warships with torpedoes using its "stealth" ability, high speed and small size to launch and survive these attacks – although they were employed in a wide variety of other missions, including the rescue of General MacArthur and his entourage from the Philippines.

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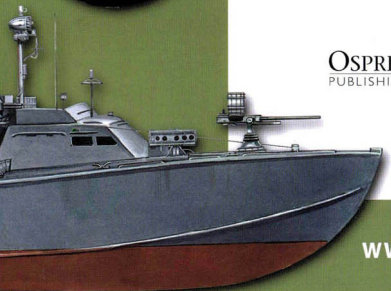

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